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BIRD-BANDING

A Journal of Ornithological Investigation

Vol. XXVI July, 1955 No. 3

PUBLISHED FOR
THE NORTHEASTERN BIRD-BANDING ASSOCIATION
THE EASTERN BIRD-BANDING ASSOCIATION
AND
THE INLAND BIRD-BANDING ASSOCIATION

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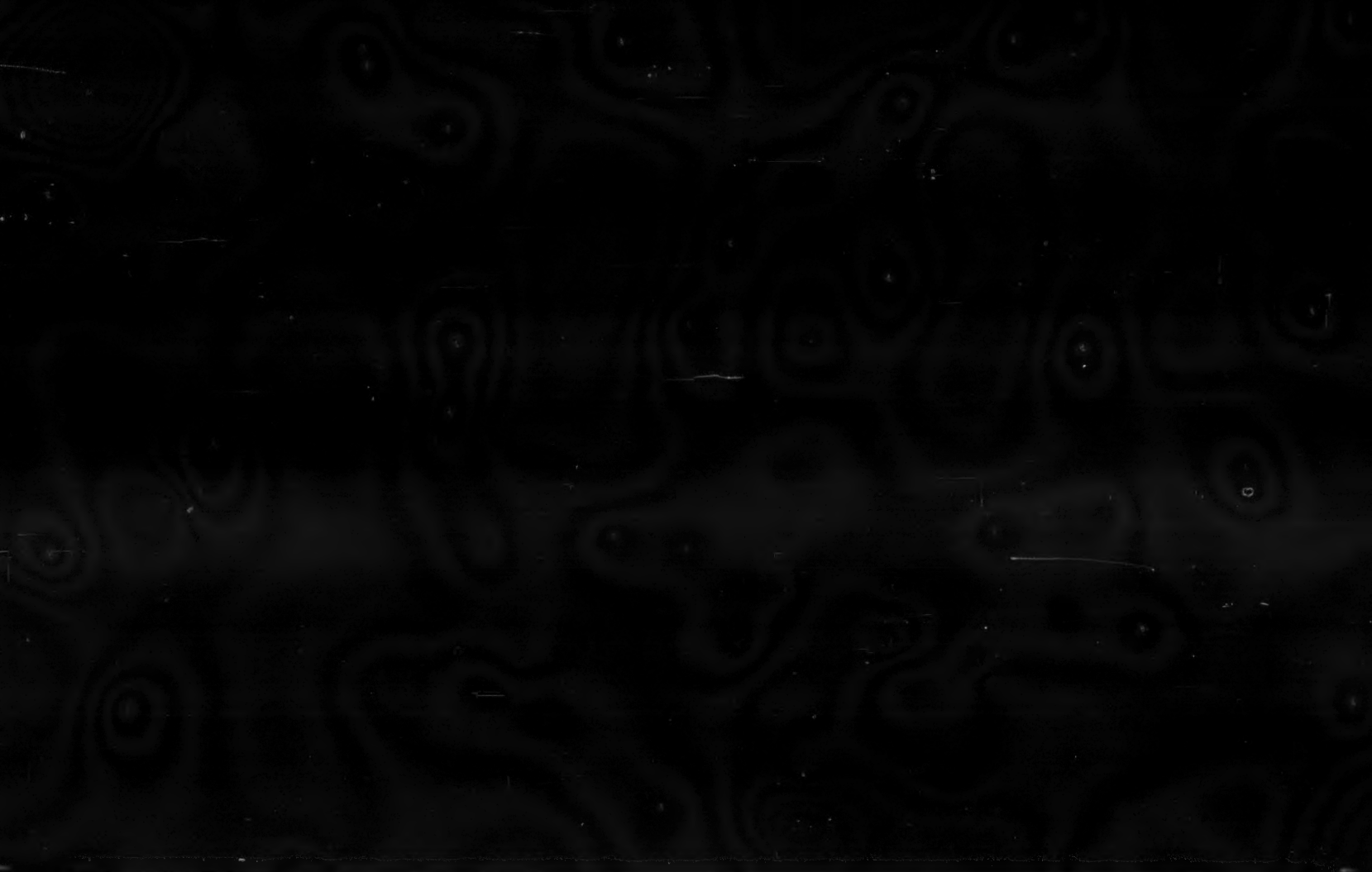

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NOTES ON THE EASTERN PURPLE FINCH

BY CHARLES H. BLAKE

The variation in color of brown-plumaged Eastern Purple Finches *(Carpodacus p. purpureus)* and the distinctions of age and sex have proven so puzzling to banders that it seemed well to undertake a renewed examination of museum specimens. It may be said at the outset that all the questions are not yet answered. However, some clarification of opinions expressed in the literature is possible.

The material critically examined contained 279 birds. Of these, 194 are in the collection of the Museum of Comparative Zoology. This includes 18 specimens from Lexington and Lincoln, Massachusetts, selected for collection from October 1952 to February 1953. The United States National Museum loaned a select series of 79 brownish individuals of *C. p. purpureus* and six examples of *C. p. nesophilus.*

This study has been greatly aided by the kind cooperation of several persons. Mr. and Mrs. Parker C. Reed of Lexington, Massachusetts, have enabled me to see a large number of living finches and to select appropriate specimens for the M.C.Z. collection. Mr. James C. Greenway, Jr., has facilitated in several ways the study of the material in his charge and arranged for the loan of the U.S.N.M. material by its curator, Dr. Herbert Friedman. Dr. John T. Zimmer enabled me to survey the material at the American Museum of Natural History. To all of them I tender hearty thanks.

Even a brief survey of the literature illustrates the dangers resident in too close adherence to one or a few characters for diagnostic purposes and in the easy assumption that the characters of the adults are essentially unchangeable. I have been impressed throughout by the remarkable amount of individual variation and the difficulty of fitting it into a consistent pattern of change.

An ideal statement of the problem is desirable even though we may be somewhat discouraged by the distance we fall short of the solution. We wish to be able to distinguish, in each sex, the following classes:

1. Juvenals, i.e. birds of the year before the postjuvenal molt.
2. First winter birds.
3. First nuptial plumage (at least in males).
4. Fully adult birds in winter plumage (assuming that males become rosy at the first postnuptial molt).
5. Fully adult birds in nuptial plumage.

Even this classification overlooks some possibilities, which have been generally ignored in ornithological literature.

1. Males delayed in assuming adult plumage.
2. Abnormally plumaged birds, such as intersexes or sex-reversed birds.

3. Aged birds (especially females).

We would make measurable progress if we could, with reasonable certainty, distinguish five categories.

1. Juvenals, ignoring sex.
2. First winter birds, ignoring sex.
3. First nuptial plumaged males.
4. Adult females.
5. Adult males.

When we resort to museum specimens we must balance the advantages of leisurely and detailed examination and ready comparison of specimens against certain well-known risks.

1. Sexing of non-breeding birds is not invariably reliable.
2. Specimens are often old and "foxed."
3. Very few individuals can be certainly aged.
4. Molting specimens are usually few or wanting.

With these considerations in mind I selected from the older part of the M.C.Z. series the following as a special subseries of brownish birds whose sexing appeared to be trustworthy.

TABLE I

SELECTED BIRDS, M.C.Z. SERIES

MALES

M.C.Z. NO.	DATE	LOCALITY	COLLECTOR
48213	1 Jan. 1896	Cohasset, Mass.	H. B. Bigelow
4728	12 May 1877	Watertown, Mass.	Bangs & Bangs
8355	23 Jan. 1884	Waltham, Mass.	W. Brewster
45873	26 Oct. 1875	Watertown, Mass.	W. Brewster
271892	17 Sept. 1870	Cambridge, Mass.	W. Brewster
8317	29 Mar. 1882	Belmont, Mass.	W. Brewster
2965	28 Feb. 1873	Watertown, Mass.	W. Brewster
4875	3 June 1871	Newtonville, Mass.	C. J. Maynard
40770	28 Apr. 1889	Washington, D. C.	C. W. Richmond
8663	21 Mar. 1884	Washington, D. C.	W. Brewster
12388	30 Nov. 1886	near Charleston, N. C.	A. T. Wayne

FEMALES

48215	Aug. 1895	Cohasset, Mass.	H. B. Bigelow
183069	7 Feb. 1931	Newton Centre, Mass.	F. H. Kennard
8360	30 Jan. 1884	Waltham, Mass.	W. Brewster
8356	24 Jan. 1884	Watertown, Mass.	W. Brewster
8345	17 Jan. 1884	Belmont, Mass.	W. Brewster
8346	17 Jan. 1884	Belmont, Mass.	W. Brewster
4903	27 Apr. 1880	Middlesex Cty., Mass.	W. Brewster
45874	28 Oct. 1875	Watertown, Mass.	W. Brewster
10905	30 Sept. 1885	Waltham, Mass.	W. Brewster
40767	28 Apr. 1889	Washington, D. C.	C. W. Richmond
40772	28 Apr. 1889	Washington, D. C.	C. W. Richmond

We are faced, then, with two major problems: age and sex. The overriding difficulty is to solve one problem independently of the other.

Age determination—It would be most helpful to have methods independent of plumage color to aid in distinguishing birds of the year

from older birds. I know of no criterion which does not gradually disappear. My personal investigations are not extensive enough to yield dates for the Purple Finch. In general, six points are worth examining.

1. Feather wear.—In most passerines the quill feathers (rectrices and remiges) are replaced only at postnuptial molts. A bird of the year does not replace them at the postjuvenal molt. (The Song Sparrow is a known exception.) Hence a bird showing symmetrical wing molt is more than a year old. The tail is a less certain indicator since accidentally lost feathers here are not infrequent and are replaced at once. A bird showing noticeable wear of all the quill feathers in very late summer or early autumn is a bird of the year. The difference in wear between old and young birds becomes less with the passage of time, being based only on the difference in age of the feathers. A further difficulty appears in the Purple Finch and will be taken up under the head of season of molt.

2. Underwing feathering. — In adult passerines a triangle on the postventral portion of the propatagium and the ventral faces of the humeral and radioulnar segments of the wing is covered by short, rather downy feathers. The area is concealed from ventral view by the pteryla patagialis corridorii (Lowe, 1942, p. 56)[1] and by the most lateral axillars. These downy feathers are acquired after the rest of the juvenal plumage. Their first appearance may really be with the first winter plumage. This bare area in juvenals is especially conspicuous before the feathers of the pteryla patagialis corridorii have attained full length. A few observations show that the Purple Finch agrees with other passerines.

3. Tibiotarsal feathering. — Juvenal passerines in mid or late summer show a noticeable sparseness of feathering of the tibiotarsus (drumstick). It may prove that the few, short, downy feathers present are part of the juvenal plumage and are replaced by more numerous, normal contour feathers at the postjuvenal molt. I have seen these bare legs on many Purple Finches which gave other evidence of being juvenal.

4. Greater primary coverts. — In passerines generally the juvenal greater primary coverts, like the remiges, form part of the first winter plumage. If, as is true for the Blue Jay, the juvenal coverts differ in color or markings from those of later plumages they may be used for age determination until the birds are a year or so old. In many species only the difference in wear between these feathers and the greater secondary coverts would be determinative. At molt the greater secondary coverts are shed almost simultaneously.

5. Incubation patch.—A discussion of this feature involves both age and sex. Bailey (1952), in an important paper, has summarized the essential points. The major skin changes, hypertrophy and increased vascularization, last from about egg-laying until the young are nearly ready to leave the nest. If these changes are present, they indicate an

[1] I suggest that the function of this pteryla is to contour and give aerodynamic smoothness to the proximoventral portion of the wing. Lowe's view is almost certainly incorrect.

adult, breeding female. The absence of such changes indicates nothing.

The other major item is what Bailey calls by the unfortunate term "defeatherization." Quite aside from its hybrid origin, the word is misleading. What is lost is not feathers in the usual sense but down. For this loss of down from most of the ventral apterium, the first event in the development of the broad patch, I suggest the term "deplumulation" (from plumula, a down). Bailey points out that it may occur a few days before the first egg is laid and the down is only regained as part of the general replacement of all feathering in the postnuptial molt. He closes his discussion with this significant sentence: "During the period between nesting and the fall molt it is difficult to distinguish the site of an old incubation patch from the unfeathered ventral apterium of an immature bird" (p. 127).

We may conclude that only a careful examination of the venter will enable one to say that an incubation patch is present and then only if the condition of the patch is favorable. The best characteristics are of relatively short duration.

6. Season of molt. — We have become used to thinking of the postnuptial molt in passerines as confined to August and the postjuvenal molt as beginning in the same month and running well into September. Magee (1936) brings forward considerable evidence that the postnuptial molt is much more prolonged in the Purple Finch. His observations dealt with the replacement of the remiges, including the tertiaries, and give no data on the postjuvenal molt. The order of molt is normal. (See Dwight, 1900). It appears that the beginning of remex molt may vary between July 5 and August 21, a period of 47 days. The same period separates the completion dates of September 16 and November 2. However, the beginning of remex molt is concentrated in the first half of the range given; about half the birds have started by July 15 and most of the rest by July 31. Magee estimated the average time required for this part of the molt as 72 days. He gave individual cases with estimated times from 55 to 98 days. Our observations suggest a duration of about 8 weeks for the postjuvenal molt.

It is clear that the postnuptial molt of the Purple Finch is a long process. The whole molt may well require more time than is given above. In passerines it seldom begins or ends in the remiges. There is much need of exact data on the occurrence and duration of molt in all our small birds. For the Purple Finch there is probably no period in summer or fall when the mere presence of molt defines an individual as adult or juvenal.

We conclude that age (as between juvenals and postjuvenals) may be determined independently for a few months during the summer and fall. It is more certainly done on a live bird seen more than once over a period of time.

Wing length—While there appears to be an average difference in wing length between male and female, the value of this character as an indicator of sex is rather small. The variation is large and so also the overlap of male and female dimensions. Other metrical characters were not studied because they are too difficult for banders to secure accurately.

The problem may be approached by finding the mean and standard deviation of a fairly sizable series of rosy males and from this computing the extremes of a series of 100 males. I measured the wing lengths (chord) of 84 rosy males. The extremes were 75 and 87 mm. with an average of 82 mm. The standard deviation was 2.4 mm. Eight selected young males (two of them pinkish) averaged 80 mm. and 9 selected females 79 mm.

Let us assume a Gaussian distribution with σ equalling 2.4 mm. Then, a series of 100 adult males corresponding to my average of 82 mm. should range from 75 to 88 mm. in wing length or 2.75 each side of the mean. A similar series of females would range from 72 to 85 mm. with an average of 79 mm. This enables us to forecast the long run experience. Four and a half per cent of females and 10 per cent of rosy males could be sexed by wing length. If the series of brown males is only taken to show that their wing length approaches that of the females, a still smaller proportion of all birds would be sexable.

If we take Ridgway's (1901, p. 128) figures only 21 per cent of my rosy male series exceed his longest female while on Groskin's (1950) basis only 8 per cent could be sexed by wing length. None of the selected brown males could be sexed by either criterion and of the females all would be sexable (against rosy males, not brown males) by Ridgway's figures but only one-third would be by Groskin's

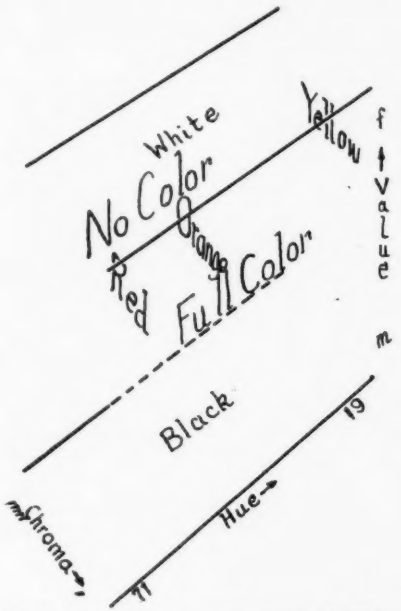

FIG. 1. Diagram of color solid, following Ridgway (1912).

criterion. It is safe to conclude that less than 15 per cent of all birds may be sexed by wing length. For some similar measurements see Weatherbee (1934). For another discussion leading to a similar conclusion see Blake (1954).

General color of the back—At the risk of retelling what many readers know I preface a discussion of the back and rump color with some fundamental points. All colors have three dimensions: hue, chroma, and value. Hue refers to the spectral position of the color, as red, yellow, etc. Chroma is a measure of the "coloredness" of the color. In terms of light we may think of a bright red light as having strong chroma which can be reduced by dimming the light. With pigments an admixture of black does nearly the same thing. Value is a measure of the depth of color without regard to chroma. Higher values represent a greater admixture of white light than do low values. In Ridgway's system hue is represented by numbers beginning with 1 for Red. The circle of hues is continuous. Red is adjoined by the reddest violet (really purple). Chroma is shown by primes; more primes, lower chroma. Finally, value is shown by lower case letters proceeding both ways from a middle value, first toward high values and then toward low values. Any color may be uniquely designated by this system and it has the merit of giving similar designations to similar colors and at the same time exhibiting the direction of passage from one color to another and the distance between them. Other numerical and literal systems will do the same thing but are less familiar to biologists. Fig. 1 shows a diagram of Ridgway's color solid in the arrangement here described. Capitalized color names are from Ridgway (1912).

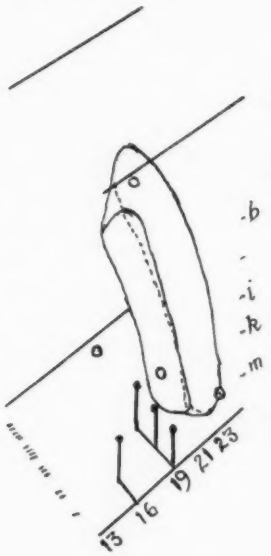

FIG. 2. Dorsal colors of olivaceous, brown birds and of juvenals of *purpureus*. In this figure and in Figs. 3, 7, and 10 the color and other data for the solid dots are given for each vertical line in order from left to right and from top to bottom on each vertical. 1st vertical — 16′m — juvenals; 2nd—19″m; 3rd—19′m; 4th—19m—olivaceous, brown birds. Top open dot — 23″ ″ ′b — Olive Gray; left lower open dot — 17″ ′k — Olive Brown; center lower open dot—21″m—Olive; right lower open dot — 23m — Olive Green. The outlined solid includes most olive hues.

In the Purple Finch there are some surprizing similarities revealed between very different looking colors.

Ridgway (1901, p. 128) may be as much responsible as anyone for the idea that the non-red individuals are "olivaceous." He says of the adult female: "Above olive or olive grayish (more olivaceous in winter), streaked with dusky and, to a lesser extent, with whitish."

There are, in fact, a few individuals which may be called olivaceous and they are striking enough to be singled out quite readily. However, it is by no means easy to assess the average coloration of an area of streaked and variegated feathers. I have tried to do this for the most olive specimens in the M.C.Z. series. The sexes are as labelled. The specimens are mostly from April, one February and two May birds being included.

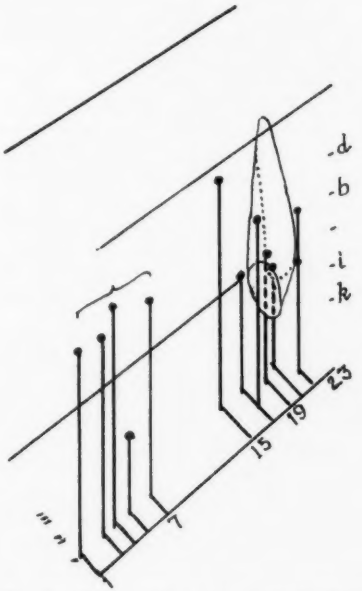

FIG. 3. Rump colors. 1st vertical—1′b—adult ♂ *nesophilus*; 2nd—3′b—adult ♂ *purpureus* and *mexicanus frontalis*; 3rd—4′c—somewhat rosy ♂ *purpureus*; 4th—5′k—pink ♂ *purpureus*; 5th—7′b—adult ♂ *purpureus*, Ft. McMurray; 6th—15″d—juvenal *mexicanus frontalis*; 7th—17″i—juvenal *purpureus*; 8th—17′b—adult ♀ *purpureus*, M.C.Z. 279357 (p. 96); 9th—19′/19″i—brown *nesophilus*; 10th—20″j—average brown *purpureus*; 11th—21′—particolored ♂ *purpureus*, M.C.Z. 724, 21′i—adult ♂ *purpureus*, M.C.Z. 44435 (p. 102). The outlined solid contains 90 per cent of brown *purpureus*. The bracket spans the range of red males of *purpureus*.

Two birds (♂ and ♀) are Medal Bronze (19m), one male is Saccardo's Olive (19′m) and five (one ♂) are Brownish Olive (19′′m). All the colors are yellowish orange-yellow of rather high chroma and very low value. In no case would I regard olive or olive-grayish as fair descriptions of the average color even though they might be for the feather edges. The actual colors are more orange (browner) and darker than Olive (hue 21), also of much higher chroma than any grayish-olive (21′′′′) or Olive-gray (23′′′′′). (Fig. 2).

The dorsal color of the juvenal plumage (see below) may be designated 16′m. This has the same chroma and value as the most olive birds but the hue is nearer orange. The usual brown bird would fall somewhere between the juvenal plumage and the selected olivaceous examples. Fresh specimens are darker than old museum specimens.

It is of interest to notice that immatures and females of *C. p. californicus* are noticeably greener dorsally than *C. p. purpureus*.

The rump—Except in the juvenal plumage, the rump is rather distinct from the back in color. This difference is mainly caused by broader light edgings and somewhat lighter central streaks to the feathers. In brown birds these edgings are usually more yellow than true Olive and paler than the average color of the back. The distribution of the colors is shown in Fig. 3. There is no evident sexual difference and in the figure all brown (M.C.Z. non-juvenals) birds are lumped together. The average color is half-way between Isabella (19′′i) and Buffy Olive (21′′k). Even the rump colors run a little browner than the truly olivaceous tints but there is a considerable overlap.

The important tendency in the rump color is toward browner colors which lead finally to the red of the adult male. Two somewhat rosy males in the M.C.Z. series show orange-red tints. No. 8317 from Belmont, Mass., 29 March 1882, is Light Coral Red (5′b) and no. 4875 from Newtonville, Mass., 3 June 1871, shows Jasper Pink (3′d). Probably these birds are males well over a year old. The shift seems to involve all three color dimensions and yields redder colors of higher value and chroma than the rump colors of juvenals and females.

The more or less reddened males may be placed in three groups. Immature but pinkish males show rump edgings of hues 5 and 7. Fully rosy males have these edgings of hues 1 and 3 and much lighter than the pinkish males. Some adult males (M.C.Z. #279191 and 279194) are not distinguishable in color from some immature males. The third group includes a few unusual birds such as a parti-colored male and an odd bird from Ft. McMurray described below (pp. 102, 108).

It appears probable that adult females fall into two groups. The first of these is of the same hue (20) as the average brown bird but is lighter. On the other hand some adult females are quite buffy yellow in general tone. One of these (M.C.Z. 279357 from Lincoln, Mass.) has the rump edgings Antimony Yellow (17′b). Further comment on this bird appears below (p. 106).

The juvenal rump color is close to Tawny-Olive (17''i).

There appears to be a very marked variation in the rump color of some individuals from year to year. The best record of this variation is in C. L. Whittle (1933, 1934), Whittle and Whittle (1927), and H. G. Whittle (1928). The comments on five birds, all supposed to be females, may be summarized.

Band No. 66868	20 July	1924	not very olive yellow
		1925	strong olive yellow
		1926	not very olive yellow
		1927	reddish brown
66881	5 July	1924	strong olive yellow
	31 May	1925	reddish brown
	15 May	1926	not very olive yellow
	9 May	1927	same
83998	15 June	1924	strong olive yellow
		1925	same
		1926	same
	14 May	1927	dull rosy with central patch of rich olive yellow
	9 May	1928	yellow with patches of rich reddish brown in upper tail coverts
A18034	5 May	1925	rosy
	29 May	1926	similar
	13 May	1928	crimson but duller than in old males
B69309	5 May	1931	yellowish olive
	18 Apr.	1932	more rosy
	1 Oct.	1932	pale rosy
	5 Apr.	1933	bright yellow
	16 Aug.	1934	rich, dark rosy

In the last bird the postnuptial molt of rump feathers in 1932 seems to have occurred after 1 October.

Throat markings—The portion of the throat between the malar stripes shows great variation in the amount of dark marking. The juvenals show uniform heavy marking. At the other extreme are a few brown birds with practically no dark markings in the area. The differences are not due to wear. As the rosy males lack dark throat marks we may suggest that the differences are in some part a matter of age.

Although there seems to be great individual variation, the general statement above is borne out by averages based on the scale of markings given in Fig. 4.

TABLE II. GRADES OF THROAT MARKINGS

Juvenals	4	M.C.Z. series
Imm. females	3	12 from Washington series
Imm. males	2	12 from Washington series
Adult females	3½	7 from Washington series
Rosy males	0	M.C.Z. series

Seven immature males from the Lexington series average 2½. The immature males and females overlap almost completely. None of the females are Grade 1 but a few males are Grade 4. The group of adult females undoubtedly includes some in first nuptial plumage. Repeated estimates by banders handling known old birds will give us a better grade figure. One adult female (M.C.Z. 279357), a very yellow bird,

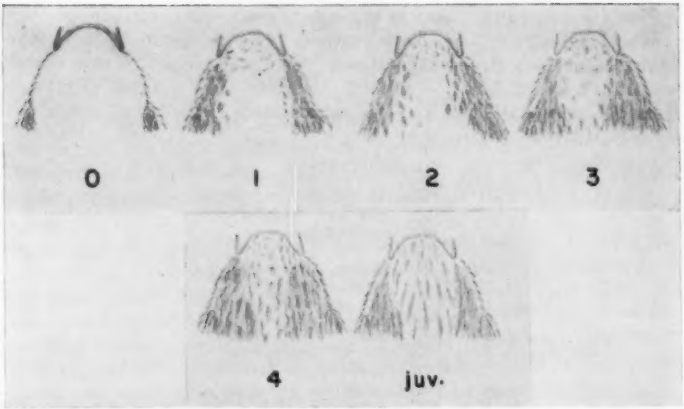

FIG. 4. Scheme for numerical grading of throat markings.

has the throat of type 1 and a similar bird (Amer. Mus. Nat. Hist. 365491) taken Jan. 1, 1892, at Bridgeport, Conn., is type 2.

Breast, sides, and flanks—These portions of the underparts show two points of interest, the variation in the streaking and their buffiness. A third point, pink tinting, will be taken up later.

Because the streaks on the ventral feathers differ considerably according to location, I have placed the chief reliance on the side of the bird about opposite the tips of the greater primary coverts and two to four streaks lateral to the edge of the unmarked central area. As a possible aid in describing the streaking I propose the arbitrary, numbered scale of Fig. 5. The drawings are diagrams not precisely showing any individual feather. It will be seen that the streaks are either somewhat linear or are subtriangular (deltoid). There is some difference in the upper (i.e. proximal) angle of the deltoid streaks. Over the chest the streaks tend to be more deltoid than on the sides. In a few cases these broad streaks carry down onto the sides so that their streaking might be rated 4½. The extreme of dark marking of the underparts is shown by a bird (A.M.N.H. 25510) marked ♀ and taken in New Jersey in November 1848 which has the sides and a band across the upper breast almost solid brown.

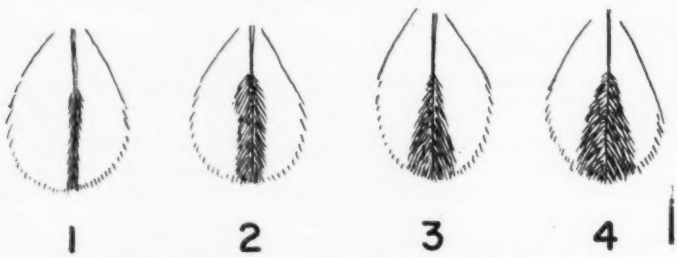

FIG. 5. Scheme for numerical grading of side streaking.

Taking the birds of the M.C.Z., Lexington, and part of U.S.N.M. series whose age and sex both seemed certain, we may draw some rather tentative conclusions. The juvenal streaking is about midway between 2 and 3. It is certainly narrower than that of the first winter plumage. The streaking of the brown first winter plumage is the broadest found in any plumage but quite variable and averages nearly 3½. It may well prove that it is slightly broader in females than in males (3½:3) but a wide overlap is evident. There are only three specimens that seem to be clearly adult females and they average just over 2½ or a little narrower than in first winter plumage. One of these is the yellowish bird (M.C.Z. 279357) which is type 2. On the other hand a similar looking bird (A.M.N.H. 365491) has its sides type 3.

The males offer a more involved problem. Two pinkish males in first winter plumage are both 3 which is about what one would expect. Two similar looking *adult* males are both 2. Two quite rosy adult males still show some streaks on the sides and average just under two. The normal rosy male shows no streaking. It appears that the narrowest streaks occur on the most highly colored males. The question that remains is what is the effect of increasing age on the streaking of females? Only bird-banders who save samples of side feathers or carefully record the grade of the streaking can clarify and extend the above conclusions.

The buffy tone of the underparts of some Purple Finches is well known. When fully developed it is found as an outer zone on all the streaked feathers (Fig. 6.) of the underparts except the undertail coverts. Its color is best studied on the breast feathers. For this purpose I have used the Lexington series, where three tints were found: Pale Ochraceous Buff (15′f), Light Ochraceous Buff (15′d), and Warm Buff (17′d). The average (7 birds) is practically Light Ochraceous Buff. Since the four pinkish birds in the same series show three similar tints they may be mentioned here and the whole set of colors shown in one diagram. These pinkish tints on the breast feathers are also buffy: Pale Flesh Color (7′f), Salmon Color (9′d), and Apricot Buff (11′b). Finally, the rosy males have edgings which are from Eugenia Red (1′-) to Jasper Pink (3′d). It is noteworthy that all these colors are of the same chroma (′) and that increasing maleness of plumage correlates with increasing redness. (Fig. 7.).

FIG. 6. Fresh (Sept.) breast feather of a brown bird.

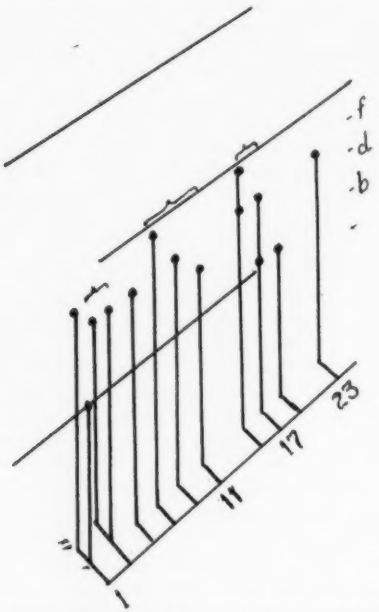

FIG. 7. Breast colors. 1st vertical—1′d/1″d — adult ♂ *nesophilus*; 2nd — 1′ — adult ♂ *purpureus*; 3rd — 3″b — adult ♂ *purpureus*, M.C.Z. 276012 (p. 102); 4th—3′d—adult ♂ *purpureus*; 5th — 7′f — pink ♂ *purpureus*; 6th—9′d—pink ♂ *purpureus*; 7th—11′b—pink ♂ *purpureus*; 8th—15′f, 15′d—brown *purpureus*; 9th — 17′d — brown *purpureus*; 17′ — brown ♂ *purpureus*; 10th — 19′ — adult ♂ *purpureus*, M.C.Z. 40764 (p. 102); 11th—23′d—adult particolored ♂ *purpureus*, M.C.Z. 724. Left bracket spans breast colors of normal adult ♂ *purpureus*; center one, pink ♂ *purpureus*; right one, brown *purpureus*.

Buffiness of the ventral feathering is evidently a character of the fresh winter plumage but does not occur on fully rosy males. The loss of the character is, in part, due to fading. Starting with brown birds (M.C.Z. series) in July, we find a late July bird very buffy and almost wholly in fresh plumage. Three others are largely unmolted and only one shows some buffy. One bird of early August is mostly in juvenal plumage and shows only a trace of buff. The other two August birds, all 11 from September and all 8 from October are very buffy and in fresh plumage. The amount of buffiness is less in November and December but more than shown by any later birds. Two out of nine January birds show a trace but none is shown by 10 February and four March birds. Two out of 16 April and one out of 17 May

birds show a trace. C. L. Whittle (1928) came to the same general conclusion. The occasional persistence of buff in the spring may be confined to extreme buffy females.

Mesial streakings of undertail coverts—Ridgway (1901) remarks that the longer undertail coverts are rarely marked with narrow, mesial streaks of dusky. I found such streaks on 8 per cent of the rosy males and on 10 per cent of the brown birds of the M.C.Z. series. One out of the three M.C.Z. juvenals showed them. It is highly unlikely that so rare a character can have any diagnostic value as to age or sex.

Mr. Parker C. Reed is of opinion that this streaking occurs on a much larger proportion of birds than stated above. His records of 48 birds handled in November and December, 1952, validate this opinion since exactly half of them show streaking. In a few cases the shorter coverts are streaked as well as the longer ones.

Red or yellow feathers on brown birds—The occasional presence of red feathers on the heads of brown birds has long been known. Whittle and Whittle (1927) hold that such feathers may occur on females. A more rare condition is to find an occasional greenish yellow feather. The present series shows five birds with red and four with yellow feathers. Only one of these nine birds is considered to be a female. It is worthy of remark that most of the birds with yellow feathers were taken from New Jersey southward and all those with red feathers from the same latitude northward. However, no summer birds are involved, so it is not clear that a difference in breeding populations is shown.

While one would expect such red feathers to occur only where red occurs on the adult males (and such is the case), it is strange that no isolated feathers are on the rump. This latter area shows some tendency to vary as a whole rather than piecemeal.

The view that scattered red feathers are a peculiarity of males is lent some support by the fact (very generally true) that a feather lost between molts is replaced by a feather of the type that would be produced at the next regular molt. However, this supposition does not explain the yellow feathers mentioned above. Yellow is known on males but appears to be very rare. One immature male, from Lexington, Mass., (M.C.Z. 279197) has a Cinnamon Rufous feather in the left superciliary area.

Pink tinting of underparts—Four fresh specimens taken at Lexington, Mass., in October, 1952, show pink tinting of the underparts. Two (M.C.Z. 279191 and 279194) appeared to be adult males and the other two (M.C.Z. 279190 and 279193) are considered first winter males. The colors of the edgings of the breast feathers and of the rump feathers were assessed as shown in Table III.

All of these birds show some additional reddening in the way of scattered feathers in the dark areas of the head or reddish tinting of the back or shoulders. Nos. 279190 and 279191 both have definitely pink throat feathers. Fig. 7 shows the colors of the breast edgings in relation to the colors found on ordinary first winter birds and rosy males. Another immature male (279195) shows several deep pink

TABLE III. SELECTED MALES FROM LEXINGTON

M.C.Z. NO.	BREAST	RUMP	STREAKING OF SIDES
Adult			
279191	near Apricot Buff (11'b)	Brick Red (5'k)	2
279194	Pale Flesh Color (7'f)	near Brick Red	2
Immature			
279190	Salmon Color (9'd)	Morocco Red (5k)	3
279193	Salmon Color	Brick Red	3

throat feathers and a rump near Hay's Russet (7'k). The color of the edges of the breast feathers is not determinable. It seems reasonable to conclude that pink tinting of the underparts is a mark of males but that it does not bear any well-defined relation to age. However, the pinkness of the underparts does vary with the general reddening of the plumage. The transition from buff to pink or light red is a gradual one and we may regard the colors given above as mixtures of buff and light red.

Particolored birds—The section above on red or yellow feathers on brown birds describes the initial manifestations of particoloring. Here I describe some M.C.Z. specimens which exhibit patches of color rather than just isolated feathers. The first is a brown male, No. 48213, from Cohasset, Mass., Jan. 1, 1896, which shows a small patch of yellowish in the malar stripe and another on the opposite side of the breast. These two patches are not quite identical in color but both are near Yellow Ochre (17'-). The color is similar to but of lower value than the buffy colors of the edgings of the breast feathers.

No. 18811 from Wellesley, Mass., May 3, 1885, has part of the right side of the upper tail coverts with Old Gold (19'i) edgings. It is a quite normal adult male otherwise except that the crown is bluer (Pomegranate Purple) than the others measured. Two other adult males show yellowish areas. One, from Cambridge, Mass., Jan. 25, 1892, (No. 44435), has the edgings of most of the rump and upper tail coverts Olive Lake (21'i). The other, No. 40764, Minneapolis, Minn., Apr. 14, 1888, shows a small patch of Primuline Yellow (19'-) on the left side of the breast.

C. L. Whittle (1928) describes an "olivaceous" bird (band no. A28-748) as having a primrose yellow patch on abdomen and flank and buffy under tail coverts. The variability of such particoloring is pointed out by H. G. Whittle (1928) who describes a probable female (band no. 83998) which on May 14, 1927, had the rump dull rosy with a central patch of rich olive yellow and on May 9, 1928, had a yellow rump with patches of rich, reddish brown in upper tail coverts, and a few crimson feathers in the crown.

The final example (M.C.Z. 724, Watertown, Mass., Feb. 28, 1873) is a remarkable harlequin male. It has yellowish areas in the following places: most of crown but not nape, forehead, most of superciliaries, front of cheeks, sides of chin, an irregular horseshoe across the middle of the breast and down the centers of the sides, edgings of greater secondary coverts, most of scapulars and across the middle of the back, upper part of rump and a little of the right upper tail coverts. Except

for a few breast feathers there is no intergrading of yellowish and rosy. The almost complete symmetry of the pattern is quite striking. The crown color is Antimony Yellow (17′b), the rump Wax Yellow (21′-) and the breast Barium Yellow (23′d). The red portions are of normal color.

Although it seems not unreasonable that females with reddish areas may be relatively old, it is not yet clear what yellow patches on males mean beyond local peculiarities of the carotinoid metabolism. From the tendency of the patches to involve whole feathers I would conclude that the site of the change is in and closely adjacent to the feather follicle. The phenomenon can hardly have an environmental or dietary origin in the cases described. The House Finches from Molokai Island noticed below may owe their abnormal color to some extrinsic cause. In this connection I cite the fact that caged Purple Finches have the red replaced by golden yellow. One such bird marked as a caged ♂, second molt is A.M.N.H. 83078. Since the specimen came from the Sennett collection it may be *C. p. californicus*. Another specimen (A.M.N.H. 365714) taken Apr. 8, 1911 at Witch Creek, San Diego County, California, is very similar.

The yellow colors noted in the descriptions above have hues within the general range of olive but are of slightly higher chroma than the usual rump color of females or young. This would appear to be nothing more than a greater replacement of melanin in the barbs by carotinoids as is generally true of the feather edgings in males. I have handled one rosy male with a patch of olivaceous on the right side of the rump. The red rump feathers lacked, as usual, the dark central streak but this was fully developed in the olivaceous feathers.

Precise chemical knowledge of the carotinoid pigments in this species and other related finches is clearly a desideratum for our understanding of the color sequences.

Note. At this point we may insert a description of an immature female (M.C.Z. 279356) taken at Lexington, Mass., 14 January 1953. At first sight the specimen is normal. A closer look shows that the wing quills are marked with a white stripe resembling that found in other cardueline finches. In the right wing the fourth to second secondaries are white for about half their length from the bases. The white does not extend so far out the fifth secondary. The first secondary shows no white! The first four primaries have the white areas extending about 2/3 their length. From the fifth to the eighth primary the feather bases are dark, gradually reducing the length of the white patches. On most feathers the distal end of the patch is some 19 or 20 mm. from the end of the feather. Its extreme outward extension is to about 15 mm. from the ends of the sixth and seventh primaries. The left wing is similar but the first secondary is like its neighbors and a little of the outer edge of each vane of the fifth and sixth secondaries is whitened. While each vane of the feathers is whitened there is a dark shaft streak and each white area terminates by a diagonal and vague line, blending into the normal dark color.

If these wing stripes are not of the same genetic origin as those in other finches, then they are a remarkably good imitation. That they

might be the latter case is, perhaps, hinted at by the all dark right first secondary. In any event I am inclined to regard this feather as of a different feather coat from the rest of the remiges. We are certainly not dealing with either traumatic or genetic white spotting. We may conclude that it has nothing to do with age or sex and, further, that the marks are not an extension of the normal light edges of the quill feathers, since these are not white in any plumage.

The colors and the color changes due to wear—No attempt will be made to discuss all aspects of feather color in this section. The intention is to show the physical mode of production of some rosy, olive, and yellowish colors and the close relation that exists between them. The matter has already been touched on by Dwight (1900), Whittle and Whittle (1927), and C. L. Whittle (1928). There is general agreement that wear leads to a brightening of the red and yellow colors in spring. There seems to be only a rather minor prenuptial molt, confined to the front of the head and occurring around mid-April.

Red or yellow colors involve the replacement of brownish or blackish melanin by red or yellow carotinoids in the barbules and ultimately in barbs and even feather shafts. In general this replacement is centripetal. After the feather is fully formed color change results from the effects of wear and fading. The former is again centripetal while the latter affects all the exposed portion of the feather but is most conspicuous in the less deeply colored parts. The various olive tints come from the apposition of yellow barbules and blackish barbs.

All of the brown, olivaceous, and buffy feathers show one general pattern: (Fig. 8.) a dark central streak and a more or less wide light margin which is usually still lighter toward the edges of the feathers. Abraded plumage (Fig. 9.) tends to be darker and browner than fresh plumage. The effect of fading is to increase the contrast between the light and dark portions of each feather. The over-all result is narrower and lighter edgings than in fresh plumage. On balance the general tone may become slightly browner and the streaking a little more evident.

C. L. Whittle (1928) points out that yellow feathers have both barbs and barbules yellow. There may be some confusion here between carotinoid yellow and melanin yellow. He says further that olive-yellow and rosy feathers have such color only in the barbs while the

FIG. 8. Fresh (Sept.) back feather of a brown bird.

FIG. 9. Worn (late May) back feather of a brown bird.

barbules are pale gray to smoky. This accords with the usual situation in birds. It further agrees with Dwight's (1900) statement that reddening in spring is due to wearing away of whitish barbs. Whittle and Whittle (1927) confirm this and also find some yellowish rump colors to vary from the same cause. They describe other specific colors:

1. Pale brown—pinkish brown barbs and unworn very dark gray barbules;
2. Brown—reddish brown barbs and partly worn dark gray barbules;
3. Reddish brown—a. reddish brown barbs without barbules,
   b. rosy barbs and partly worn dark barbules.

The role of fading is more difficult to assess exactly since one would rarely know with certainty the initial color of the feather. The loss of ventral buffiness in the first winter plumage arises both from a rather extensive loss of the feather margins involving as much as half the length of some barbs.

Wearing away of the less heavily pigmented parts of the barbs may play a much larger part in color change than has been generally recognized. Dwight (1900) pointed out the power of heavily pigmented parts of feathers to withstand abrasion. In brown birds the light margins referred to above are much abraded by May. The change is even clearer on the back feathers of rosy males. In fresh plumage each feather has a dark center then a rosy zone and finally a nearly white margin. Such birds have a "frosted" appearance. By May this white margin is almost abraded away but the rosy zone has suffered but little damage.

Finally, it must not be supposed that the visual difference between yellow and red is indicative of any far-reaching chemical differences. No data exists on which to base a specific statement. The gross colors of carotinoid samples depend on concentration as well as on chemical composition and stereoisomeric state of the individual components.

Juvenal plumage—The eleven birds (4 males, 7 females) in juvenal plumage range in date from 20 June to 16 October. The juvenal plumage may be known by its general fluffiness and by the short and decomposed undertail coverts. These characters hold of passerines generally. More specifically, the underparts are heavily and rather finely streaked except on the center of the belly and the undertail coverts. The general impression is that the underparts are grayer in tone than in later plumages. This is not borne out by examination of single feathers. The grayness arises from the dark gray down showing through the terminal portions of the feathers. There is scarcely a trace of ventral buffiness.

The upper parts, particularly crown and nape, are a more uniform dark brown (close to Prout's Brown or Mummy Brown) than in later plumages. This means that there is little distinction between the central streak and the feather margin.

The greater secondary coverts are conspicuously tipped with buffy brown and the outer vanes of remiges and rectrices show distinct yellowish olive margins. These margins wear sufficiently rapidly to become obscure or wanting in the first winter plumage.

I do not find myself in agreement with the inference of Whittle and

Whittle (1927) when they speak of juvenals as quite buffy. There is no evidence of difference between the sexes in juvenal plumage. We may sum up the first plumage as the darkest and plainest of the plumages.

First winter plumage—As has been already pointed out there seem to be two extremes of the first winter plumage grading into one another. The normal brown plumage passes by way of birds with scattered red (or yellow) feathers to quite pinkish male plumages described in the section on pink tinting of the underparts.

In the normal plumage the general color of upperparts, wings, and tail is brownish with a light superciliary stripe extending well behind the eye and another along the malar region dorsal to the dark lateral throat stripe. In a few cases the upperparts have a somewhat olive cast. Individually the dorsal contour feathers have very dark central streaks, Blackish Brown (1) (1''''m) to Fuscous Black (13''''m), a lighter midzone and still lighter edges (Fig. 8). Museum specimens show the greatest foxing in the darkest parts of the dorsal feathers. The wing and tail feathers are generally dark with narrow olivaceous edgings. The underparts are whitish with subdeltoid streaks, except the belly, and with the buffy margins already discussed. There is no clear cut indication of sex in this plumage but it is probable that those with the narrowest ventral stripes are male and those with the widest, female.

Since the adult female plumage is very similar it would be unexpected to detect any evident transitions. Males do show transitions. As already noted, and contrary to Whittle and Whittle (1927), the presence of scattered red feathers, at least in first winter plumage is almost confined to males. Any more extensive reddening or a pink wash on the underparts is also chiefly a male character but not necessarily an indicator of first winter plumage. This pinkish wash correlates with a slight lightening of the ventral streaks.

The adult female—So far as is now apparent one might, without much risk of error, adopt the second paragraph of the preceding section as a description of the adult female.

There remains to be considered the possibility that old females may become somewhat masculine in plumage. Some cases have already been noted in the sections on rump color and on particolored birds. The particular birds are Band Nos. 83998 and A 18034. In both the rump acquired a reddish tint at ages of at least three or four years. I have handled one female, Band No. 49-21170, which when at least three years old showed a reddish cast at the rear of the crown. It is possible that occasional red feathers on the head are also a mark of very old females as they appear to be of young males.

Any series of apparently adult females is almost certain to contain a fair proportion of birds in first nuptial plumage. It is not surprising that the seven adult females in the Washington series (5 of them spring birds) show throat markings averaging over 3 and side streaking averaging nearly 4. Only the bird banders can tell us much about fully adult females.

The buffy yellow adult female already referred to (M.C.Z. 279357)

has the rump edgings Antimony Yellow (17′b) which is near the orange limit of the rump colors of brown birds and between the yellowish and the reddish groups in the male series of colors. This same bird has an Ochraceous Buff (15′b) breast which falls in the orange half of the series of buffy breast colors. The yellowish colors of this adult female are about midway between those of the first winter plumage and the pinkish males.

Adult male—The fully plumaged male has the pileum, malar stripes, throat, breast, sides, and most of rump and upper tail coverts reddish. The remaining contour feathers of the head, dorsum, and wing coverts have reddish margins, which on the dorsum and greater and middle secondary coverts are more or less edged with white in fresh plumage. The outer vanes of the remiges and rectrices are narrowly margined with some shade of red or orange. The underparts are usually unstreaked, the belly white, and the under tail coverts white or, occasionally, buffy pink. The auriculars are a rather violet brown. The

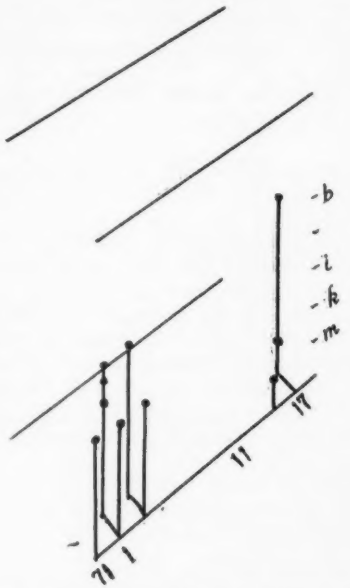

FIG. 10. Crown and forehead colors. 1st vertical — 71i — adult ♂ *purpureus* and *nesophilus*; 2nd—1′—adult ♂ *purpureus*, 1′h — average adult ♂ *purpureus*, 1′i — adult ♂ *purpureus*; 3rd — 1i — adult ♂ *purpureus*; 4th—3′—adult ♂ *purpureus*, Ft. McMurray; 5th—3i—adult ♂ *mexicanus frontalis*, 6th—15m—juvenal *purpureus*; 7th—17′b—particolored adult ♂ *purpureus*, M.C.Z. 724, 17′m — juvenal *purpureus*.

centers of the red margined dorsal contour feathers and the quills are dark brown. Contrary to Ridgway (1901) I find streaking of the underparts, except under tail coverts, to be very rare (less than 2% of M.C.Z. series).

Ridgway refers to the color of the crown as "deep wine purple (more crimson in summer)" and to the rump and underparts as pinkish wine purple. (Fig. 10). These colors, based on the 1886 edition of his color standards (see Ridgway, 1912, p. 41), are about 70′k or between Rosolane Purple and Indian Lake. These colors are bluer than those I found except the crown of one bird. I took seven clean adult males at random from the M.C.Z. series with the following results.

TABLE IV. ADULT MALES, M.C.Z. SERIES

NO.	LOCALITY	DATE	CROWN	RUMP	BREAST
14083	Milton, Mass.	May 10, 1887	Acajou Red	Old Rose	Alizarin Pink
9316	Shelbourne, N. H.	July 10, 1884	Carmine	Old Rose	Jasper Red
18579	Oden, Mich.	May 20, 1888	Acajou Red	Lt. Jasper Red	Alizarin Pink
18811	Wellesley, Mass.	May 3, 1885	Pomegranate Purple	Old Rose	Jasper Pink
11865	Middlesex Co., Mass.	Oct. 4, 1886	Eugenia Red	Jasper Pink	Alizarin Pink
66061	Lexington, Mass.	Nov. 20, 1914	Eugenia Red	Lt. Jasper Red	Lt. Jasper Red
723	Watertown, Mass.	Mar. 2, 1875	Acajou Red	Lt. Jasper Red	Old Rose

The average colors of this group are: crown (1′h) between Acajou Red and Eugenia Red, rump (3′b) Light Jasper Red, and breast (2′d) between Alizarin Pink and Jasper Pink.

The extent of variation is shown by a specimen (M.C.Z. 231531) from Ft. McMurray, Alta., which was examined because the center of the lower breast and the sides were nearly white. Its red colors proved to be more orange than those already listed: crown, Jasper Red (3′-); rump, Carrot Red (7′b); and breast, Coral Pink (5′d). It will be noted that the value and chroma of these colors are sensibly identical with the average colors.

There do not appear to be any reliable statistics on the age at which the adult male rosy plumage is assumed. We may agree with Magee (1926) who says, "The crimson plumage is not acquired until the bird is at least a year old, and in many not until at least two years old." Earlier (Magee, 1924) he had expressed the opinion that the very brightest were four years old. In the light of the Lexington series I conclude that some males become pinkish at the postjuvenal molt and some not until at least the first postnuptial molt. These are cases of a gradual transition but I have evidence from my banding data that in other cases the change is abrupt from brown to quite fully rosy.

The two pinkish adult males in the Lexington series are M.C.Z. nos. 279191 and 279194. Both are finishing the fall molt. The first bird has the edgings of the chest feathers near Apricot Buff and those of the rump Brick Red. The head and throat are much reddened with

some of the throat feathers close to Eugenia or Acajou Red. The other bird shows Pale Flesh Color on the chest and rump edgings near Brick Red; the pale superciliary and malar lines are pinkish and there is one red feather each in the forehead, crown, and chin. These birds are different from the pinkish immature males already described in being somewhat more generally reddened and having narrower streaks on the sides.

H. G. Whittle (1928) describes a bird which may be a xanthochroic male. The crown was bright olive yellow with similar feathers on the sides of head and the underparts. Rump and upper tail coverts were nearly as yellow as the crown. Apparently no red was present. This suggests a more extreme color variant along the same direction as M.C.Z. no. 724.

The sex ratio—It is possible to form some notion of the proportion of brownish and rosy birds to be expected in a large population. No calculation of this sort is very good unless an adequate life table is available. This is not the case for our species. Using the table given by Magee (1940) for survival of older birds, we may estimate that the whole population of Purple Finches from mid-winter to late spring contains about 80 per cent of birds not over one year old. These will all be brownish birds.

Magee (1938, 1940) and Groskin (1950) have both deduced the sex ratio of adults from return data. This method appears to be entirely satisfactory. Magee (1940) includes the data from his earlier paper and secures a ratio of 100 males: 74 females. The departure from equality seems surprising but Groskin (1950) gets 100 males: 71 females. When the two figures are weighted for sample size we are led to take Magee's 100: 74. Applying this ratio to the remaining 20 per cent, i.e. birds over one year old, we find a further 8½ per cent should be brownish. The over-all result is 88½ brownish birds to 11½ rosy males.

This calculation assumes certain things which may not be true. As hinted above it assumes a certain type of life table. It also assumes that the sex ratio is established so early that it does not differ in populations with differing age composition. Lastly it refers to the total population and not to samples seen by banders. The composition of these samples certainly is not always that of the population as a whole.

Newfoundland Purple Finch—Burleigh and Peters (1948, p. 122-123) described a new subspecies, *C. p. nesophilus*, as follows. "Similar to *Carpodacus purpureus purpureus*, of the northeastern United States and eastern Canada, but upperparts in both sexes decidedly darker. Pileum of adult males deep, maroon purple, in contrast to the deep wine purple of *purpureus*. Underparts duller and lacking the pinkish tinge of the nominate race. Females and subadult males less olive above, with the whitish streaks of the back broader and more numerous. In size, both sexes average slightly larger than *purpureus*." The dimensions can be tabulated as:

	WING	TAIL	EXPOSED CULMEN
3 breeding males	84.3mm.	57 mm.	11.8mm.
2 subadult males	70	55.2	10.8
4 breeding females	80.7	57.5	10.7

Peters and Burleigh (1951, p. 372-373, pl. 28) add nothing and confuse the matter by calling the male "rose-red," which would be roughly descriptive of the Eastern Purple Finch. *Nesophilus* is not certainly known outside Newfoundland.

Since a name properly rests on the published description and not on specimens, it is appropriate to begin with an analysis of the description. The pileum of the nominate race is called deep wine purple. So far as this color (evidently quoted from Ridgway, 1901) can be identified from Ridgway (1912) as 70′h. I find it too blue. It is, of course, partly a matter of literary style whether one uses "contrast" or "distinction" in referring to the color in *nesophilus*. "Deep, maroon purple" can only be identified as 72′i (between Indian Lake and Acajou Red). It would be more helpful to have the color according to Ridgway (1912). In any event, the difference is a rather small one especially when compared with my average *purpureus* color, 1′h, which is on the opposite side from Ridgway but even nearer to *nesophilus*. It is quite problematical what color is to be deduced from the description quoted above for the underparts of the adult male. The statements on the female and subadult male are, in my opinion, inconclusive, considering the variation both in color tone and white streaking that I have seen. A calculation similar to that in the section on wing length indicates that only 2¼% of adults of either race could be distinguished by wing length. I suppose "70" under subadult male to be a misprint for "80." One is forced to the conclusion that *nesophilus* cannot be distinguished from the nominate race on the basis of the original description of the former except in the unlikely situation that the lengths of tail and exposed culmen are significantly different.

The only fully adult male at hand (Biol. Surv. no. 394071) was collected 22 May 1947. The crown is Pomegranate Purple (71i), the rump Old Rose (1′b), the throat Hydrangea Red (1′′i) and the sides of the breast between Alizarin Pink (1′d) and Vinaceous (1′′d). (Fig. 3, 7, 10).

As noted above, M.C.Z. no. 18811 also has the crown Pomegranate Purple but the rest of its red coloring is that of *purpureus*.

In *purpureus* we have already seen that the rump averages 3′b or Light Jasper Red in color but three of the seven specimens on p. 108 showed Old Rose (1′b). The present example of *nesophilus* matches a considerable proportion of *purpureus*.

If the specimen has underparts typical of *nesophilus*, we may interpret "duller" in the original as meaning "of lower chroma." On the other hand "lacking the pinkish tinge" is hardly a fair statement unless the describers define pink on a far narrower basis than does Ridgway. The hue is certainly a pink as is the value. The chroma approaches the limit of Ridgway's named pinks. Summing up, the adult male of *nesophilus* at hand has the breast of very slightly lower chroma but of the same hue and value as does *purpureus*. The tendency of the

throat feathers in specimens to be suberect renders it an unpropitious region to discuss.

The upperparts of the specimen of *nesophilus* show, for me, no trustworthy distinctions from *purpureus*.

Before leaving the adult male, attention may be drawn to an adult male (M.C.Z. no. 276012). This rather large bird (wing 86 mm.) was collected at Lexington, Mass., 6 December 1952. It was banded at Lewiston, Me., 27 Apr. 1951, retaken 12 May, as an immature. The crown is Acajou Red (1′i), the throat Deep Vinaceous (1′′b), the breast near Light Corinthian Red (3′′b) and the rump Old Rose (1′b). The crown is the same as in *purpureus*. The throat is close to *nesophilus*. The rump proves nothing. The sides of the breast are still further toward the orange and away from *nesophilus* than is the average of *purpureus* but both the male *nesophilus* and the present male are within the hue and value range of *purpureus*. However, the chroma of the breast is a trace further from *purpureus* than is even the *nesophilus* specimen. On the basis of the available evidence the specimen could fairly be called *nesophilus*. It seems unlikely that a bander with live bird in hand would be justified in making the distinction.

Turning to the brownish specimens of *nesophilus*, we look first at the rump edgings. Two of the females are Olive Lake (21′i), one is Buffy Citrine (19′k) and one Old Gold (19′′i). These colors are all within the range of *purpureus*. The general color and markings of the back are not, in my opinion, distinguishable from fresh, brown examples of *purpureus*, taken in October, 1952. The remaining specimen is a male without trace of redness, taken 24 June 1945. It differs from the preceding only by having the rump near Cream Buff (19′′d). Only one example of *purpureus* shows a higher value than this.

I conclude that no clear distinction is present to separate *nesophilus* from *purpureus*. The Newfoundland birds may be the distal element of a cline. An adequate breeding series from Nova Scotia and New Brunswick might be instructive. The only adult male I have seen from the Gulf of St. Lawrence area (M.C.Z. 5488) was taken at Fox Bay, Anticosti Island, 9 July 1881. Its coloring is within the usual range of *purpureus*. In view of the above it is not strange that the race has not been recognized away from its breeding range. For the time being I prefer not to recognize the purple finches of Newfoundland as meriting a separate trinomial.

Distinctions from the House Finch—Since the House Finch *(C. mexicanus frontalis)* appears to be locally established in the northeastern United States (Elliott and Arbib, 1953), I summarize the distinctions between it and the Eastern Purple Finch.

The one general difference is that the tail is deeply emarginate in the Purple Finch and slightly, if at all, in the House Finch. Further, *frontalis* shows some average metrical differences from other races of *mexicanus:* wing over 70½ mm. (♀) but not exceeding 84½ mm. (♂) and depth of bill at base not over 10 2/3 mm. (Ridgway, 1901).

In adult, rosy males the Eastern Purple Finch has the greater secondary coverts edged with reddish; the top of the head is near Acajou

Red or Eugenia Red, the edgings of the rump feathers are Light Jasper Red and similar coloring extends well down the upper tail coverts and up the back; the throat is about Eugenia Red which in similar but paler shades extends over the breast and upper belly; the sides and belly are mostly unstreaked. The outer vanes of the quills are pinkish.

The adult male House Finch has the greater secondary coverts edged with pale grayish; the forehead is Nopal Red and similar color extends along the superciliary line but not over the crown; the edgings of the rump feathers are Jasper Red, not extending to upper tail coverts and back, although the interscapulars may be edged with reddish; the throat is Light Jasper Red which extends in paler shades over the chest; the lower sides and belly are mostly streaked. The outer vanes of the quills are grayish, as in *Carpodacus cassini.*

Females and immature males (first winter plumage) of the Eastern Purple Finch have the upper parts conspicuously streaked with dusky or the general color tends toward slightly olive brown.

In the House Finch these forms have the upperparts brownish gray obsoletely streaked with darker (Ridgway, 1901). The difference seems to be that, in this species, the central and intermediate zones are occupied by the same color, especially on the head, giving a scaly effect.

The juvenal plumage of the Eastern Purple Finch has the upper parts quite dark (see above) and apearing nearly unstreaked. The light edgings of the rump feathers are about Light Brownish Olive. The edgings of the wing feathers are Tawny Olive. The underparts are moderately coarsely streaked.

The same plumage in the House Finch is generally lighter in tone, particularly the upperparts. The edgings of the rump feathers are about Cinnamon Buff. The wing edgings are Tilleul Buff, a grayer and lighter color than in the Purple Finch. The underparts are finely streaked.

It also appears that in all plumages the undertail coverts are streaked in the House Finch but this is a less frequent character in the Purple Finch.

Although the colors given in this section do not represent the complete range of tints, they do show adequately the nature of the differences between the two species. The House Finch is clearly a paler and grayer bird in all the plumages compared, except the red portions of adult males. These red portions will average (except the rump) slightly paler and more orange in the House Finch. A series of House Finches from Molokai I. (T.H.) show a quite complete conversion of red to yellow and some particolored (red and yellow) males are present from the normal range of the form.

A standard set of observations on brown Purple Finches—As a final point I suggest a standard set of notations to be made on each brown Purple Finch each time it is handled.

a) The state of molt and estimate of whether the molt is postjuvenal or postnuptial.

b) Presence or absence of juvenal plumage.

c) Gape color.

d) Number, location, and color of any red, orange, or yellowish feathers.

e) Sites of reddish or pinkish tinging, especially on the crown, wing coverts, rump or underparts.

f) Grade of throat and side streaking.

g) Streaking of undertail coverts.

h) Wing length.

i) Color of outer vanes of wing and tail quills.

j) Any unusual features not noted above.

Summary and conclusions—We should first consider how the case stands with regard to the five categories listed on pp. 89-90. Juvenal birds may be told by color, markings, and feather structure without much risk of error. Until early fall some, and perhaps most, juvenals retain identifiable amounts of juvenal plumage so that the postjuvenal molt may usually be known as such. No external distinctions of sex have been found in juvenals.

Except as the postjuvenal molt may determine, it does not seem to be possible to make an unequivocal discrimination between the first winter and the subsequent brown plumages, barring a few cases of precocious transition to extreme plumages. Some points have not been adequately explored: 1) distinctions of structure and color in the wing and tail quills; 2) similar distinctions in the greater primary coverts; 3) streaking of the underparts; 4) scattered red feathers. Useful results may be got from these items. No universal means of telling sex is available. In a small proportion of the males the first winter plumage has a general pink cast.

Since the first spring (nuptial) plumage of males is derived by wear and fading from the first winter plumage, it is not uniquely distinguished from the latter nor from most female plumages. When there is precocious reddening in the first winter plumage it overlaps certain retarded older male plumages. The possibility that some added reddening about the head may be acquired by a partial prenuptial molt should be kept in mind. (Fig. 11)

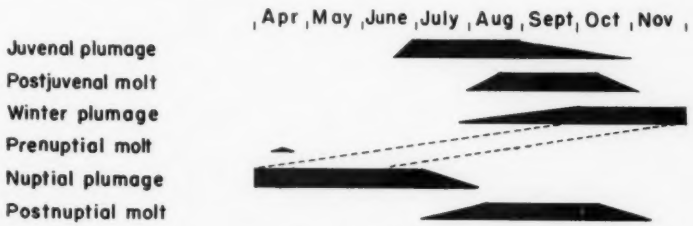

FIG. 11. Diagram of plumages and molts. The winter and nuptial plumages are essentially the same plumage.

TABLE V. SYNOPSIS OF CHARACTERS

	UNDER WING FEATHERING TIBIOTARSAL FEATHERING	GREATER SECONDARY COVERTS	UNDERTAIL COVERTS	MAIN COLOR OF UNDERPARTS	RUMP COLOR	THROAT MARKINGS	EDGING COLOR OF BREAST	STREAKING OF SIDES	SCATTERED RED FEATHERS
JUVENALS	—	Shed together in postjuv. molt	Short, fluffy	Grayish	Brown	4	Whitish	2½	—
FIRST WINTER MALE	+		Fully formed	White	Brownish-olive to Brick red	2	Buffy to salmon	3	±
FIRST WINTER FEMALE					Brownish-olive	3	Buffy	3½	—
FIRST NUPTIAL MALE		Shed together in postnuptial molts		White to pinkish	Brownish-olive to Brick red	2	White to salmon	3	±
FIRST NUPTIAL FEMALE				White	Brownish-olive	3	White	3½	—
OLDER MALES				Pinkish to rosy	Brick red to rosy	1-0	Salmon to rosy	2-0	+ to all rosy
OLDER FEMALES				White to Buffy-yellow	Olivaceous to reddish brown	2-3½	White to Buffy-yellow	2-3½	±

As to the adult female, I conclude that this stage cannot certainly be told from the usual brown first winter birds, except for the yellowish-buff females. The streaking of throat and sides may yield criteria adequate to identify old females.

Finally, the adult male is, with very few exceptions, readily known by the redness of crown, throat, and rump. The few retarded birds may probably be distinguished from similar males in first winter or first nuptial plumage by narrower streaking on the sides. The above points are summarized in Table V.

A still broader statement may be made on coloration. The over-all change is an increase, proceding centripetally from the feather edges, in the amount of carotinoids with a corresponding recession of the melanins. This recession takes place on the underparts even in default of any visible deposit of carotinoids. These changes are carried further in males than in females. It is not certain whether red and yellow in this species differ qualitatively or only quantitatively.

The winter and nuptial plumages differ almost wholly through wear and fading. The nuptial plumages will tend to lack whitish or pale edges on the dorsal feathers and wings and tail quills. The feather centers, when pigmented with melanin, will be lighter. The buff on the underparts is largely lost in brownish birds.

Plumage and wing length are usable in determining sex in extreme cases. The incubation patch when certainly present is diagnostic for females but available for only a few weeks. Cloacal examination will be useful for a somewhat longer period (probably April to July).

The sex ratio is rather far from unity (100 males: 74 females). About 11½ per cent of all individuals should be rosy males.

The amount of dark marking of the throat appears to change with age. Records of this change are very desirable.

There is still some doubt of the frequency of streaked undertail coverts and its relation, in adult males, to the pinkness of the area.

The occurrence of red and yellowish feathers on the head and throat is still of uncertain meaning. Are they a feature of males alone? Not entirely, but how frequent are they in females? Do they occur as replacement feathers for those lost accidentally? Do they yield any evidence of a very minor prenuptial molt?

Males can produce yellow feathers in areas that should be rosy but there is no indication of the mechanism of such a variation of color. This variation may well not be the same as the occasional appearance on males of patches of female type plumage.

The proposed Newfoundland subspecies *(C. p. nesophilus)* is tentatively rejected.

The House Finch *(C. mexicanus frontalis)* is distinguishable in the hand in all plumages.

Banders can greatly advance our understanding of the Purple Finch by a careful record of each individual handled and its changes with age.

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GENERAL NOTES

A Supposed Bird Banding Record in the Great Basin in 1846.—Some time ago I came across an alleged banding record in the literature which if valid would not only be one of the first instances of banding known but also an extreme longevity record. This item of ornithological interest was first noted in J. Cecil Alter's History of Utah (p. 473, vol. 3) having been taken from The Millennial Star (June 25, 1894, Vol. 56: 416), which is a magazine of the Church of Jesus Christ of Latter Day Saints. The story had in turn been taken from Territorial papers but with no indication as to the particular one or the date.

The account is as follows: "A wild goose has been captured west of the Utah line. Attached to the bird's leg was a very thin piece of brass, an inch long and half as wide. On this is punched with a pointed instrument, 'Fremont Party, September, 1846, B.B.J.' It is presumed that the initials are those of Colonel B. B. Jackson, who was a member of Fremont's exploring expedition when it passed through that region nearly fifty years ago. The venerable colonel is living somewhere in Sonoma County, California, and has been informed of the capture.

If he remembers having turned a tagged goose loose in 1846 the bird will be presented to the California Pioneer Society."

When I brought this to the attention of E. Alexander Bergstrom, Editor of *Bird-Banding*, he commented that a 48-year recovery record would be phenomenal since the oldest bird known through banding up to that time had reached only about 27 years and that it was doubtful that any Canada Goose (the most likely species) had been recovered with more than a 15-year span. Indeed the oldest record in captivity for the Canada Goose was 32 years. He thought it would be particularly remarkable to achieve this longevity record with a makeshift band, considering the definite loss of modern bands through wear in long-lived species. Since the record rested solely on the newspaper account, which did not rule out the possibility or probability of a hoax, he suggested that an investigation be made to establish whether this was a bona fide early banding record or a skillful hoax. Accordingly I launched upon some historical detective work with the following interesting results.

Since I could find no mention of a Colonel Jackson or of any bird banding in Fremont's reports, I first made inquiry of the Society of California Pioneers with headquarters in San Francisco. Mrs. Helen S. Giffen, Secretary, wrote that a scrutiny of their gift list prior to 1906 revealed no mention of a goose or a band from a goose having been presented by anyone. If such an item had been in the collection it would have been destroyed along with the rest of the Society's collection at the time of the 1906 earthquake and fire. Mrs. Giffen was unable to locate a Colonel B. B. Jackson in their Sonoma County records. However, in a volume marked Bodie (in Mono County, California), she found the following handwritten notation about him, evidently made in 1879. "Age, Sept. 27, 1879, 64 years; Born Pennsylvania; Departed Peoria, Ill., March 6, 1845; Arrived Oregon City, Sept. 15, 1845; Route, Plains." Thus it would appear that Jackson travelled west before the third Fremont expedition and arrived in California a year prior to the supposed banding date of the goose. The Fremont party did not start from Bent's Fort until August 16, 1845. They spent two weeks in September in the vicinity of Great Salt Lake in September 1845 before continuing westward across the Great Basin to California. Colonel Jackson may have had some connection later with the Fremont Party in California when Fremont exchanged the role of explorer for that of a soldier and became involved in the Bear Flag Revolt. In September of 1846, Fremont was slowly working his way north from Los Angeles to Monterey, recruiting among American residents of the area.

The search next involved locating the original newspaper account for possible further particulars. A page by page search of the most likely prospect was made, the result being that it was soon found in the *Deseret Evening News* for Thursday, May 24, 1894, p. 8. This account was essentially the same as the previously quoted version except that the introductory sentence reads: "James H. Sturgeon captured a wild goose at his place one day last week, and he thinks that he has a grand prize." In the last sentence the date of the bird having been banded and released is given as 1849 rather than 1846. Most significant was the source indicated at the end of the passage, namely, "Homer (Nev.) Index."

Next I wrote to the Nevada State Historical Society. Mrs. Clara S. Beatty, Director, replied that she had not been able to find anything about the banded goose in the Reno papers of the 1894 period and that neither the band nor the goose had been given to the Nevada Historical Society Museum. However, some references she found in the Reno Evening Gazette of the 1891 era suggested that the Homer Index was the paper published at Lundy, Nevada, a town in the western part of the state near Bodie, California. Mention was made in one excerpt that she sent me of Sturgeon's hay wagon having arrived at Lundy. In other passages there was mention of a Jim Townsend with the suggestion that he edited the Homer Index.

Thus two leads pointed to the Bodie, California area, so I next wrote the California State Library at Sacramento. Allan R. Ottley, California Section Librarian, replied that no reference in their records had been found to any banding of a wild goose by B. B. Jackson. He furnished a lot of information about James William Emery Townsend. The latter was indeed a resident of Lundy and edited the Homer Mining Index. This weekly paper was evidently his last venture for he died in 1895 or '96.

Perhaps the most revealing information was the account appearing in Samuel

P. Davis' History of Nevada, 1913, Vol. 1, p. 476, as follows: "*Jim Townsend.*—This unique specimen was by all odds the most original writer and versatile liar that this coast, or any other coast, ever produced. He began his journalistic career in Mono County with the *Mono Index* and wound it up in Carson City, where so many newspapers lie buried. He kept the coast laughing for years with quaint sayings that he set up as from the case they came into his mind. They never saw manuscript. He simply set the type when he felt like expressing an idea and worried himself almost to death because he could not set the type as fast as he could think.

"To read his paper you would think it was published in a city of ten thousand inhabitants. He had a Mayor and City Council, whose proceedings he reported once a week, although they never existed, and enlivened his columns with killings, lawsuits, murder trials and railroad accidents and a thousand and one incidents of daily life in a humming growing town, every last one of which he coined out of his own active brain.

"One of the most exciting things with which he kept churning up his readers was a shooting scrape and scandal and divorce proceedings arising from a scandal in which the Mayor's wife and a member of the city council figured. It dragged along through his columns for nearly six months. It was very interesting to read and implicitly believed—except by persons who knew that there was no mayor and no council at that time in the town where Jim's paper was published.

"He was called 'Lying Jim Townsend' to the day of his death and could he have had his way it would have been graven on his tombstone."

Townsend was the original of Bret Harte's Truthful James. The fabulous humor of Townsend is dwelt upon in a longer account of him in "Bret Harte and Truthful James" by Robert L. Fulton in the Overland Monthly, 87: 89-98, August, 1915.

After learning about Jim Townsend who undoubtedly wrote the goose story, it seems certain that the banding was a hoax as Editor Bergstrom suspected. Either the whole thing was entirely a figment of Townsend's fertile imagination or was a practical joke on Sturgeon in which Jackson participated unwittingly or otherwise. Or perhaps the reverse was true. In any event this supposed early banding and longevity record is discredited.—William H. Behle, Biology Division, University of Utah, Salt Lake City.

Interesting Starling Returns.—I have been trapping and banding Starlings for two or three decades at Garden City, New York, but it is so seldom one is retrapped that there have been very few returns, although there is usually a larger or smaller percentage of banded individuals (by observation) about the station. My trap was in operation, although not every day, throughout the twelve months beginning September 1953, and new birds of various species taken and banded. These included 2 Starlings in September, 19 in October, 21 in November, 2 in December (total 44); none in January, 1954, 6 in February, 10 in March, 6 in April, 4 in May, 2 in June (total 28), none in July or August.

It was surprising and entirely unprecedented when three return individuals were trapped on May 22, 1954, and a fourth on May 23. At this date they should have been on or near their nesting grounds, and it is interesting that all four were banded in November; corroborating a previously held opinion that many of our Starlings return to home territory in fall, though they may not remain there through the winter (1937, *Bird-Banding*, VIII, pp. 76-77).

Of the four, 2 (including that of May 23) were banded on November 14, 1953; one on November 4, 1953; one on November 9, 1952. These four were the only Starling returns trapped during the twelve months in question. It suggested itself that they belonged to a wandering unit group, such as seem to make up our resident Blue Jay population (Kimball and Nichols, 1945, *Bird-Banding*, XVI, pp. 130-134).

Another point of interest is eye color. Male Starlings have a dark eye, dark brown I suppose, but rarely sufficiently pale to be noticeably brown offhand. But in a minority, presumably females (Kessel, *Bird-Banding*, **22**: 16, Jan. 1951), it has a noticeable pale or paler rim. The eye of the Nov. 9, 1952, bird (512-17824), and of the two of Nov. 14, 1953 (502-48421 and 22), had a pale rim; that of the one of Nov. 4, 1953 (512-17895) did not. And it was the same when the four were taken as returns in May, 1954.—J. T. Nichols.

A measure of the effect of Hurricanes Carol and Edna.—From the bandings of juvenal Eastern Purple Finches last summer and fall by Mr. and Mrs. Parker C. Reed at Lexington, Massachusetts, it is possible to get a one-point measure of the effect of the hurricanes of 31 August 1954 (Carol) and 11 September 1954 (Edna) on a bird population. This may be done by comparing departures over short periods adjacent to the hurricanes with the weeks including hurricanes.

On the weekend of 21/22 August, 28 birds were banded of which 54 per cent were not present on weekend of 28/29 August or later. The weekend of 28/29 August, 20 birds were banded and 60 per cent were not present after 31 August. The rate of departure was, then, 11 per cent greater for the week including Carol than for the preceding week.

After 31 August but before 11 September, 37 birds were banded of which 68 per cent were not present after 11 September. For comparison, 59 per cent of the 49 birds banded on 12 September were not present thereafter, an increased departure of 15 per cent for the week including Edna.

Regardless of the degree of confidence we may have in an average increased departure of 13 per cent of Eastern Purple Finches due to a hurricane, we can, I think, conclude that the effect was relatively small.—Charles H. Blake, Massachusetts Institute of Technology, Cambridge, Mass.

Celluloid color bands.—I have been able to secure some practical data on celluloid color bands made by Messrs. A. C. Hughes, 1 High Street, Hampton Hill, Middlesex, England. These are split ring bands, like the aluminum bands now used, and come in four small sizes and several colors. The makers provide a special device for opening and applying the bands. They must be cemented shut, easily done with acetone. Four larger sizes are available in coil bands ("flat bands").

Hughes type and size	Inside diam.	F and W size
Split PX.F	2.08 mm	0
Split PX.C	2.80 mm	1B
Split PX.B	3.69 mm	Between 1A and 2
Split PX.3	4.40 mm	Between 2 and 3
Flat band Size 1	5.62 mm	3A (plus 0.1mm)
Flat band Size 2	6.74 mm	Between 4 and 5
Flat band Size 3	8.35 mm	Between 5 and 6
Flat band Size 4	9.52 mm	6

I suggest sizes for some common birds as follows:

PX.F	PX.C	PX.B	PX.3
Chickadee	Downy Woodpecker	Catbird	Blue Jay
Tree Swallow	White Breasted Nuthatch	Robin	Thrasher
House Wren	Bluebird	Baltimore Oriole	Starling
Goldfinch	House Sparrow	Cowbird ♂	
Tree Sparrow	Cowbird ♀	Rose Breasted Grosbeak	
Chipping Sparrow	Purple Finch	Evening Grosbeak	
Field Sparrow	Song Sparrow	Towhee	
Junco			

The bands are made in solid colors, wide stripe (two colors each occupying about half the height of the band), and narrow stripe (five narrow alternating horizontal color stripes). Even the wide stripes are rather hard to make out at a little distance and the narrow stripes are not recommended.

Through the kindness of Professor Stanley Backer and Mr. Roland Derby, a series of bands representing almost all the available colors were subjected to 900 hours in a fadeometer (about 6 months of sunny weather). Black, white, yellow, and brown were unchanged. Orange, green, and dark blue were slightly bleached, red bleached to pink. Heliotrope, light blue, pink, and light green were severely bleached.

Dark blue, black, and probably brown would hardly be distinguished at a distance. Green and light green seem to be different only in their resistance to bleaching.

Abrasion is not consequential since the colors go clear through the celluloid.

The best selection of plain colors seems to be black, white, yellow, orange, red, and (dark) green. The following wide striped combinations of the foregoing colors are available: orange/white, yellow/white, black/orange, red/yellow, green/white, yellow/black, and black/white.

The plain colors (split ring) are 1/3 [18c] per dozen and the striped ones 1/6 [21c] per dozen.—Charles H. Blake, Massachusetts Institute of Technology, Cambridge, Mass.

RECENT LITERATURE

BANDING

(See also Numbers 14, 15, 16, 20, 49)

1. A Survey of the Birds Ringed in Finland during the years 1913-1952. Göran Nordström. 1954. *Ornis Fennica*, **31**(4): 116-130. In the four decades covered by this general report 128,046 birds of 197 species were banded in Finland. The totals of bandings and recoveries are tabulated by species and by families. *Larus ridibundus* heads the specific list in numbers banded with 18,995 individuals, followed in order by *Turdus pilaris* (8,646), *Sterna hirundo* (7,271), *Parus major* (6,253), and *Sturnus vulgaris* (6,031). The 3,734 recoveries, divided among 117 species, are 2.9 percent of the bandings. Of these 35 percent were taken in Finland, 65 percent in 46 different countries abroad. Germany reported the most bands (421), followed by Denmark (383), Sweden (291), France (282), and Italy (212). Finland's nearest and largest neighbor, the U.S.S.R., which certainly must take more of Finland's migrant birds than any other country does, reported only 41 for 13th place in the list.

Banding in Finland has had its ups and downs, which reflect the country's political and economic conditions. Very little banding was done during the two World Wars and in the years immediately following them. Before World War I the high year was 1914 with 1,396 bandings. The totals rose steadily from 656 in 1925 to a high of 12,288 in 1936. The program did not really start again after World War II until 1949, when 1,289 birds were banded. Since then it has increased rapidly. The 1953 totals of 14,830 passed all previous records, and at the time of writing more than 21,500 had already been reported marked in 1954. This is good news indeed, and we all hope the upward progress it signifies continues uninterrupted in the years ahead.—O. L. Austin, Jr.

2. Comparison of Recoveries from Reward and Standard Bands. Frank C. Bellrose. 1955. *Journal of Wildlife Management*, **19**(1): 71-75. Waterfowl banding records appear to offer a more valid approach to hunter kill than do comparisons of populations and kill figures. The principal weakness is the failure of many hunters to report bands. To obtain information on this project the U. S. Fish and Wildlife Service in 1948 issued a special series of reward bands. Over twice as many reward bands were reported the first year as standard bands, but the difference declined sharply. In 1949, 759 reward bands and 360 standard bands were used to mark Mallards *(Anas platyrhynchos)* to determine the lethality of lead shot. There were 31.7 percent reward bands and 19.7 percent standard bands recovered. In 1950-51 the experiment on lead poisoning of Mallards was tried again with the reward bands marked $2.00 Reward. Up to July 1954 there was an average of 2.2 times as many $2.00 reward bands reported as standard bands. Recoveries compared for four regions in the Mississippi Flyway indicate there is some difference in the propensity of hunters to report bands. Canadian region hunters reported 1 standard to 1.92 reward bands; northern region reported 1 standard to 2.10 reward bands; central region reported 1 standard to 2.61 reward bands; and southern region reported 1 standard to 2.10 reward bands. Close proximity to banding stations has little effect upon percent recovered. On the average one hunter in three reports a standard band. It would appear that the kill of ducks by hunters is at least 2.5-3 times greater than that indicated by unrefined band data.—Keith M. Standing.

3. The Use of Banding Data in Determining Waterfowl Migration and Distribution. Walter F. Crissey. 1955. *Journal of Wildlife Management*, **19**(1): 75-84. Much banding has been done that shows route of travel only. Present-day problems in waterfowl management require knowledge of the relative number of birds that use each route. The first step in determining relative volume of movement from breeding-ground population units to each of the Flyways is to band nesting adults, or juvenals prior to the flying stage, and to associate the birds banded with population "index" figures from appropriate breeding-ground surveys. Banding during migration periods is of little value for determining distribution because of the difficulty of relating the birds banded to the size of the population being sampled. A rough measure of volume of movement can be obtained by banding on wintering grounds when the birds are relatively sedentary, and the number of birds being sampled can be determined by censuses. In measuring volume of movement, it is necessary that information be available with which to determine what the recovered sample represents after movement has taken place. Important problems in this respect are: (1) Proportion of birds available which are recovered, and (2) proportion of bands recovered which are reported to the U. S. Fish and Wildlife Service. A determination of proportion of birds available which are killed is dependent on a knowledge of the total birds available. The number of birds killed, or number of hunters involved cannot be used to determine the proportion killed of birds available. A properly designed banding program would have real value in supplying a solution to this problem. Between half and two-thirds of the bands recovered by sportsmen are never reported. Sporadic publicity has lessened the value of banding data. Standardized publicity should be promoted.—Keith M. Standing.

4. Methods of Trapping Woodcocks on their Breeding Grounds. William G. Sheldon. 1955. *Journal of Wildlife Management*, **19**(1): 109-115. The author conducted intensive research on several methods of capturing Woodcocks *(Philohela minor)* in Massachusetts. Data collected on recaptured, banded birds yielded information basic to their management. The author developed an automatic butterfly-shaped trap to capture singing male birds attracted by a mounted woodcock simulating a female. The mechanical parts, specifications, size, and appearance are given in the paper. Many variables such as weather, location of trap site, and individual skill affect trapping success. The general procedure followed is to set the traps in the late afternoon, spend the singing period spotting new sites, tend traps and remove decoys after dark, leaving all traps set blind for the dawn flight. Trapping should be uninterrupted throughout the singing season regardless of weather. The smaller the singing field, the better the chances are of capturing the bird. Instructions are given for setting the traps. Mounted woodcocks were used as decoys for 3 years and then plastic models were substituted with almost equal success. Another method, used by Gunn, was to play a tape recording of a singing male in the presence of performing males. He had good success in luring the birds in and then capturing them in a collapsible net. Japanese mist nets were used to a limited extent. They work on the principle that when a bird hits the net, it falls into a pocket and becomes enmeshed. Some success was attained in using funnel-shaped traps.—Keith M. Standing.

5. Results of the ringing investigation of migration instituted by the Royal Museum of Natural History, Leiden, 40 (1953), 1. (Resultaten van het ringonderzoek betreffende de vogeltrek, ingesteld door het Rijksmuseum van Natuurlijke Historie te Leiden, XL, (1953), 1.) G. C. A. Junge and J. Taapken. 1954. *Limosa*, **27**(3): 92-110. Raw data for some 430 returns and recoveries received in 1953 for 35 species of water birds (cormorants through terns) banded in the Netherlands. As in the previous list (see *Bird-Banding*, **25**: 152) *Anas platyrhynchos*, *Anas crecca*, and *Vanellus vanellus* lead in numbers of recoveries, accounting between them for almost half the list. Again the list contains a gratifying number of recoveries from behind the Iron Curtain. Most of these are of waterfowl, many of them taken some years back—it takes a long time for the word to get through. Among them are: 9 *Anas platyrhynchos* from Poland; a *Spatula clypeata* and an *Anas penelope* from the Komi A.S.S.R. just west of the Urals; two *Anas querquedula*, one from Archangel, the other from Saratov on the Volga; and three *Anas crecca*, one from Chkalov in the foothills of the southern Urals, one from Vorony on the Don, the other from the Novgorod District. Also of interest are an 11-year *Accipiter gentilis*, a 19-year *Buteo buteo*, and an 18-year *Haematopus ostralegus*.—O. L. Austin, Jr.

6. Banding Birds on Ushant Island. (Le Baguage des Oiseaux a L'ile d'Ouessant.) M. H. Julien. 1954. *Penn-ar-Bed* (Bulletin des Cercles Geographique et Naturaliste du Finistere), new series No. 4 & 5: 6-17. A semi-popular article, evidently designed to arouse local interest in banding. The author bands a few nestlings, but gets most of his birds from the many attracted to Creac'h lighthouse at night during migration. He also uses both Italian and Japanese nets at suitable places on the island, and traps waders along its shores. He lists none of his bandings, and gives no indication of the size and extent of the program. He does give the raw data (with map) for 10 foreign-banded birds taken at Ushant, and for the two foreign recoveries of his own bandings, none of them particularly new or startling. The article closes with a short bibliography and instructions for obtaining official permission to band birds, warning, however, that nobody unwilling to devote a great deal of time, expense, thought, and care to banding should attempt it.—O. L. Austin, Jr.

MIGRATION

(See also Numbers 42, 47)

7. Bird Mortality at Airport Ceilometers. Joseph C. Howell, Amelia R. Laskey, and James T. Tanner. 1954. *The Wilson Bulletin*, **66**(3): 207-215. Airport ceilometers, used to measure the height of the cloud ceiling, consist in part of a light with a candlepower rating of about 25 million. This light is focused into a steady vertical beam about 2 degrees wide. Circumstances surrounding 12 instances of bird mortality, involving from 3 to more than 1,000 birds, at ceilometers in the United States are examined. Ten instances occurred during the fall migration season and the other two during the spring migration season. Mortality was detected only at night, and when there was a cloud ceiling of 5,000 feet or less. Deaths were almost certainly caused by impact with the ground, with another bird, or with a nearby building. Species involved (mostly Passeriformes) seemed to be a random sample of migrants to be expected at that time and place. On-the-spot observations suggest the birds were first attracted to the light and then became blinded or confused by the light before colliding.—L. Richard Mewaldt.

8. Body Weight and Fat Deposition in Captive White-throated Sparrows in Relation to the Mechanics of Migration. Albert Wolfson. 1954. *The Wilson Bulletin*, **66**(2): 112-118. A few data gathered at Evanston, Illinois in the years 1945-47 on "fat classes" and body weights of wild and captive White-throated Sparrows, *Zonotrichia albicollis*, are employed to show that profitable comparisons may be made between wild and captive birds in the study of avian migration.—L. Richard Mewaldt.

9. Bird Mortality During Night Migration October 1954. James T. Tanner and Others. 1954. *Migrant*, **25**(4): 57-68. "On the nights of Oct. 5-6, 6-7, and 7-8, 1954, a tremendous number of migrating birds were killed at a minimum of 27 localities scattered thru-out the eastern and southeastern states. The accidents occurred around airport ceilometers, brightly lighted areas, and at television and radio towers." The contributing weather condition was a moving cold front with a solid overcast with low cloud ceiling, forcing the birds to fly at low levels. The lights at the ceilometers at Nashville and Knoxville were turned off, thus saving many birds. Catastrophes at Air Force Bases could easily be averted if the operators were alerted on the danger nights. The list of the birds killed at seven localities in Tennessee is appended.—M. M. Nice.

10. The Pattern of Migration in 1953 at the Irish Sea Bird Observatories. Peter Davis. 1954. *British Birds*, **47**(12): 414-422. Based on reports of the four southwestern Bird-Observatories with tables summarizing spring and fall data on 12 common species. "Fair weather and light winds are known to be associated with strong 'normal' migration."—M. M. Nice.

11. The Pattern of Migration in 1953 at the East Coast Bird Observatories. R. K. Cornwallis. 1954. *British Birds*, **47**(12): 423-431. In spring there was very little development of drift from the Continent; there was also a lack of drift movements in fall except at Fair Isle.—M. M. Nice.

12. The Migration of the Iceland Merlin. Kenneth Williamson. 1954. *British Birds*, **47**(12): 434-441. An analysis with a chart and five weather maps of the fall migration of *Falco columbarius subaesalon*, which starts in mid-August and lasts through October. "The data support the view that clear skies and a lack of wind provide the stimulus to undertake a migratory flight, and show that journeys are made in any type of pressure-system which offers these conditions." —M. M. Nice.

13. Aircraft Observations of Birds in Flight. K. D. G. Mitchell. 1955. *British Birds*, **48**(2): 59-70. "Over the United Kingdom and to a lesser extent over Western Europe the observations indicate that there is little flight by birds at heights of five hundred feet or above, birds being encountered on an average once in every seventy hours of flying by daylight." Detailed observations are given of the species, date, locality, height, weather conditions, etc. of all birds identified. There were 31 records from 1,500 to 4,000 feet, one at 6,000—30 Lapwings, *Vanellus vanellus*, over England, and one at 8,000 feet—a Griffon Vulture, *Gyps fulvus*, circling over the Toledo Mountains, Spain.—M. M. Nice.

LONGEVITY AND MORTALITY

(See Numbers 5, 15, 16)

NIDIFICATION AND REPRODUCTION

(See also Numbers 13, 24, 26, 33, 35, 36, 39, 47)

14. Summer Movements of Black Swifts in Relation to Weather Conditions. Miklos D. F. Udvardy. 1954. *The Condor*, **56**(5): 261-267. Observations on the Black Swift, *Nephoecetes niger borealis*, at Vancouver, British Columbia during the summers of 1952 and 1953 revealed a striking correlation between their presence and the passage of low pressure systems accompanied by southeast or east winds and rain. At Vancouver in June of the two years, from eight to more than a thousand swifts were seen on 15 of the 34 days with precipitation. No swifts were seen on the 26 days without precipitation. As they are not known to breed in the immediate vicinity of Vancouver, it is suggested that they may be swifts which have temporarily left their nesting sites some distance to the northwest. Similar movements of the European Swift, *Apus apus*, are known to occur in Europe, in which cases the nestlings become reversibly torpid and may survive unfavorable weather until the return of their parents.—L. Richard Mewaldt.

15. Twelve Years of Observing the Behavior of the Stock Dove. (Douze Annees d'Observation sur le Comportment du Pigéon Colombin *(Columba oenas* L.).) E. Delmée. 1954. *Le Gerfaut*, **44**(3): 193-259 (with Flemish summary). An interesting study of the increase of the Stock Dove in the vicinity of Tournai, Belgium, with copious notes on its breeding biology. The species nests readily in wide-mouthed pottery urns placed sideways in trees for them, and in which the adults are easily trapped. From the 55 returns and 12 recoveries of the 310 doves banded—132 as adults, 178 as nestlings—the author draws the following conclusions on the species' site-tenacity (p. 222): "The habitual fidelity of young Stock Doves to their natal *canton*, which includes the territory within a 20-kilometer radius, but not to the *colonie* where they were born. 2. The fidelity of breeding Stock Doves not only to the *canton* of reproduction, but to the *colonie* where they raised their young the preceding year, and also to their old nest."

Each pair lays from 2 to 5 clutches of eggs per year; the average of 42 pairs over a 7-year period (1938-1945 omitting 1940) was 3.8 clutches. The clutches may contain from 2 to 5 eggs; the average per clutch of the same 42 pairs for 7 years was 3.8 eggs, of which 54 per cent hatched. As nestling mortality was 29.5 per cent after hatching, fully fledged young were produced by 38 per cent of the eggs laid. The average production of 62 pairs observed for 12 breeding seasons (1938-1950 omitting 1940) was 3.06 fledged young per pair per year.

The author claims annual mortality to be about 50 per cent, with no apparent difference between the first and subsequent years. In the absence of the complete raw data, which are not furnished, his estimates of mortality and longevity would be far more useful and significant had he used Lack's formulas or any of their variants in preparing them. His "average age" figure of 15 months is meaningless. (He obtained it by adding the known life-spans in months of 82 recoveries banded as nestlings, and dividing by 82.) The oldest of his recoveries lived 6 years, 9 months.

The Stock Dove is partly migratory, southward movement being largely restricted to young birds in their first winter, after which the birds seldom move more than a few kilometers from the breeding site. Nevertheless an adult banded in Belgium in May was taken in October in Spain, 1,000 kilometers southwestward.—O. L. Austin, Jr.

16. Contribution to the Biology of the Swift. (Contribution a la Biologie du Martinet Noir, *Apus apus* (L.).) P. Dachy. 1954. *Le Gerfaut*, **44**(2): 96-173 (with Flemish summary). This is a detailed report of the author's observations from 1944 to 1953 of a colony of some 15 pairs of Swifts nesting in the eaves of a church near Tournai in western Belgium. In the course of his study he managed to band 124 young and 52 adults, and to recapture on their nests 45 birds he had banded in previous years. These form the basis of his more important conclusions.

He discusses at length such varied topics as arrival in spring, nest-building, clutch size, incubation, nestlings, departure, wintering grounds, colony composition, nocturnal behavior, faithfulness to the colony and the nest (site tenacity), conjugal fidelity, longevity, body weight, copulation, effects of the weather on behavior, and enemies. He compares his observations largely with those of Lack in England, Weitnauer in Switzerland, and Koskimies in Finland, and appends a general bibliography. Unfortunately in analyzing his statistics he follows none of the standard practices, and as he does not give his basic banding data in detail, it is impossible to compare his figures with any others.—O. L. Austin, Jr.

17. Observations on the Kentish, Little Ringed and Ringed Plover, breeding near Amsterdam. (Waarnemingen over de drie bij Amsterdam broedende pluviersoorten *(Leucopolius a. alexandrinus, Charadrius dubius curonicus* en *Ch. h. hiaticula).*) J. E. Sluiters. 1954. *Limosa*, **27**(3): 71-96 (from the English summary). Reviews the breeding history of these three species near Amsterdam during the past 20 years, and discusses especially their reoccupation of new land being made available behind the dikes. "The main factor in the occupation of new areas is the nest site, rather than the food supply, the presence of water or the salt-content of the water. The Ringed Plover has practically no brood-surplus and is a rare breeding bird in new areas. The Kentish and Little Ringed Plovers have a good brood-surplus and both old and young birds will readily occupy new areas, with either natural or artificial habitats, if they are forced to abandon old breeding sites."—O. L. Austin, Jr.

18. Nest Temperatures and Attentiveness in the Anna Hummingbird. Thomas R. Howell and William R. Dawson. 1954. *The Condor*, **56**(2): 93-97. During several stages of incubation and brooding, essentially continuous records of temperature were obtained with a thermocouple in the nest of an Anna Hummingbird, *Calypte anna*, in Los Angeles, California. Periods of inattentiveness were usually less than 20 minutes and never more than 40 minutes. This parent female did not become torpid at any time while incubating or brooding. She maintained the nest about 10°C warmer than surrounding air. Little capacity for homeothermy was exhibited by the young during their first few days, but at 13 days after hatching they maintained their temperature well above that of the environment.—L. Richard Mewaldt.

19. Photographic Studies of Some Less Familiar Birds. LXII. Snowy Owl. I.J.F:-L. 1954. *British Birds*, **47**(12): 432-433. *Nyctea scandiaca* lays 4 to 9 eggs at intervals of at least 2 days; the female incubates from the first egg; incubation is estimated to require nearly 5 weeks. She broods constantly while the young are small and her mate brings all the food. He persuades her "to accept the offer by rubbing her face with the prey and trying to fit it into her beak, both birds constantly 'gruffing'," as shown in Sten Larson's fine photographs. "If the prey was not accepted the male would devour it himself elsewhere. As the young were only fed when hungrily piping, the female often put the food she took into a 'prey-collection' around the nest." "There is a strong correlation between lemming and Snowy Owl numbers and when the former are abundant, which happens in any one area about every four years, Snowy Owls increase enormously through greater clutch-size."—M. M. Nice.

20. A Field Study of Sora Rail and Virginia Rail in Central Minnesota. L. B. Pospichal and W. H. Marshall. 1954. *Flicker*, **26**(1): 2-32. Careful, detailed study of *Porzana carolina* and *Rallus limicola* during 1950 and 1951, based on trapping and marking the birds. Colored celluloid bands on the chicks were found to cause deformities or even amputations as the birds grew. Fish fingerling tags, clipped into the patagium of the right wing were more satisfactory, but could not be seen in the field. Adult Soras can be sexed by characters of the auricular patch and superciliary line, bill color in the breeding season, and measurements. In the drought year of 1950 clutches averaged 9.5 eggs for the Sora and 6 for the Virginia Rail, while in the more favorable year of 1951 they averaged 10.4 and 8.2 respectively. Valuable information is given on growth, plumage development, food of old and young, and parasites. There appears to be some mistake in calculating the length of incubation. How could one Virginia Rail embryo develop into a precocial chick in 13 days, while another took 20; one Sora in 11 days, while another needed 22?—M. M. Nice.

21. Ecology of the Virginia Rail in Clay County, Iowa. W. D. Tanner and G. O. Hendrickson. 1954. *Iowa Bird Life*, **24**(4): 65-70. On 107 acres 37 occupied nests of *Rallus limicola* were found, chiefly in lake sedge. In 28 complete clutches in 1951 and 1952 the average number of eggs was about 8. Of 190 eggs in 27 nests, 144 (75.7%) hatched. "Egg destroyers in order of their importance were small birds of unidentified species, raccoons, flood and hail."—M. M. Nice.

BEHAVIOR

(See also Numbers 13, 19, 47, 48)

22. Visual Cues of Food Places and Food Objects and their Significance for Food-seeking Titmice. (Die Bedeutung optischer Merkmale des Futterplatzes und des Futters für nahrungsuchende Meisen.) Herbert Bruns. 1952. *Biologischen Zentralblatt*, **71**: 69-108. Observations carried out in the field showed that titmice make their food choices on the basis of visual cues. This was substantiated by experiments involving spontaneous choice carried out with caged birds. Food platforms of lighter background were chosen in preference to darker ones. However, both solid black and solid white platforms were preferred to checkered or striped patterns.

Males of the Great Tit, *Parus major*, preferred fine checkerboard patterns over coarser ones, a behavior the females did not exhibit. Naturally-colored cucumber seeds were significantly preferred over those decorated with black longitudinal, horizontal, or concentric stripes, or with spots, while those colored a uniform black were only slightly preferred over the patterned ones. The author tries to relate the findings to the perceptual problem involved when patterning interferes with the form aspect of a visual stimulus.—Eckhard H. Hess.

23. Lanceolated Jays Breeding in Captivity. Derek Goodwin. 1954. *Avicultural Magazine*, **61**(5): 154-162. Very interesting account, illustrated by sketches, of the behavior of four captive *Garrulus lanceolatus*, their love life and

nesting attempts during two seasons. Both females fixed their affections on one male and he responded equally to both. At length one young was raised after an incubation period of 16 days and nestling period of 20 to 23 days. One is impressed by the striking individuality of these intelligent birds.—M. M. Nice.

24. Notes on Feral Pigeons. Derek Goodwin. 1954. *Avicultural Magazine*, **61**(6): 190-213. This important paper shows how much ornithology, in particular biology and ecology, can be learned from an abundant species with which we are all familiar but which most of us ignore. "The Pigeon *(Columba livia)* is among the commonest of birds in British towns, as well as elsewhere throughout most of the temperate and tropical regions of the world." Feral pigeons originated from domestic or dovecote pigeons which in turn are descended from wild rock pigeons. "Most Feral Pigeons are dependent on man-made buildings for their nesting and roosting sites. Man's reaction to their presence ranges from welcoming them as guests or even as sacred birds, as in many Buddhist and Moslem communities, to active dislike and attempts to destroy them in many western countries," (p. 198). Very interesting observations were made on "Feeding Behaviour and Recognition of Food." It seems that "Pigeons instinctively alight on relatively bare ground and away from the immediate vicinity of trees when seeking food." Young pigeons apparently are weaned rather suddenly. "The method of parental feeding does not enable the young one to see the food it swallows, and under normal conditions the young pigeon does not appear actively to seek food until the parents have ceased to feed it." A hungry young pigeon, if alone, will experiment on all sorts of small objects, picking them up and dropping them many times before swallowing them. If older pigeons are present the young one tries to take food from their bills. Suddenly then it starts to eat, perhaps as a result of having seen the grain picked up by the other bird.

In contrast to the pigeon's insistence on a protected nesting site, roosting sites may be exposed to wind and rain, yet resorted to night after night unless the birds are frightened away. "So long as the bird remains alive and fit for reproduction, there will be no selection against individuals that stick to an accustomed roost in spite of discomfort."

With all the *Columbidae* "the parent at first feeds the squabs with pigeon milk that forms in the upper part of the crop. When they are a few days old it begins also to regurgitate the food in its crop," and this it does more and more as the young grow. There is much more of interest in the paper on behavior and ecology as well as on physical characteristics of different forms descended from the Rock Dove. The sketches are a valuable addition to the text.—M. M. Nice.

25. Hostile, Sexual, and Other Social Behaviour Patterns of the Spice Finch *(Lonchura punctulata)* in Captivity. M. Moynihan and M. F. Hall. 1954. *Behaviour*, **7**(1): 33-76. The third study on behaviour patterns of captive Mannikins (see the papers by Morris reviewed in *Bird-Banding*, April 1955). Patterns reflecting the highly gregarious nature of this species are described. The "hostile" activities (termed "agonisitic" by Morris) are analyzed: "attack, escape, and patterns obviously produced by a simultaneous conflict or combination of attack and escape motivation." This behaviour proves to be "much less ritualized than that of many other species. This paucity of ritualization, with the accompanying sombreness of plumage and weakness of voice, is probably correlated with the extreme gregariousness—which has probably reduced the need for behaviour patterns conspicuous over long distances." The third group of activities are sexual. There are elaborate pre-copulatory ceremonies and violent post-copulatory performances. These are analyzed as consisting in both sexes of "simultaneously activated attack, escape, and sexual tendencies of varying strengths." The Spice Finch's strong gregariousness is shown by its habits of social preening and of "clumping," i.e. of roosting in a tightly packed row, a trait found only in "a few scattered families or orders." Locomotory intention movements and different attitudes during "Jingling"—the male's song—are illustrated in four sketches. A careful, detailed study with keen discussion of theoretical implications.—M. M. Nice.

26. The Pied Flycatcher. III. Feeding Biology. (Der Trauerfliegenshnäpper. III. Die Nahrungsbiologie.) Lars von Haartman. 1954. *Acta Zoologica*

Fennica, **83**: 1-96. The four chapters in this distinguished monograph are devoted to Food, Feeding of the Young, Weight, and Evolution of Size of Brood. The prey items are analyzed in Finland and found to be very similar to German studies. On the average 2.4 items were brought on each trip to the nest. A middle-sized brood will be fed some 15,000 invertebrates during the 15 days in the nest. Direct observation by means of a mirror in the nesting box was carried on for more than 250 hours, while 173 days were recorded by mechanical apparatuses.

Instead of "courtship feeding," the author suggests "marital feeding" as a better term. Male and female fed about equally except that second mates of polygamous males raised their broods alone. Males sometimes give up feeding young when going into molt. Single parents feed almost as frequently as two parents. Diagram 5 and Table 9 show the gradual increase of feeding frequency from hatching to 9 to 11 days and then a gradual decrease till flight at 15 days. In broods of 1 to 3 young the average number of feedings per young per day was 119, in those of 4 to 10 the average was 82 feedings per day (p. 28). Table 13 summarizes from the literature size of brood and frequency of feeding per young for 23 broods of 18 species.

The incubating female loses some 3 percent of her weight during the short night (4 1/3 hours). While building, females average 13.9 grams, during egg-laying 17 grams, while incubating 15 grams, but at the end of feeding young in the nest 12.4 grams. Unmated males averaged 12.3 grams, and males feeding young 12.5 grams.

The young gain very fast for about 10 days, then lose a little during the last 5 days (Diagram 18); this resembles the curve of growth in other hole-nesters. Table 10 gives data on 33 species of open and hole-nesters on length of incubation, of the period of rapid growth and of the whole nestling period. Much of this information is summarized in Table 24, where 13 open nesters are compared with 12 hole-nesters: the length of incubation averages 12.2 and 13.8 days respectively; rapid growth of the young 7.8 and 10.5 days; nestling period 10.8 and 19.3 days. The author believes that incubation period and period of rapid growth should be compared, rather than that of the whole nestling period. Yet the development of motor coordinations and of feathering is typically slower in hole-nesters than in open nesters. The larger the brood, the less as a rule each nestling weighs.

Chapter 4 is a thought-provoking discussion of the various theories as to evolution of the size of brood. There appears to be no correlation between size of brood and assistance of the male in feeding in species in *Emberiza* and *Phylloscopus*, as well as in wrens and icterids. There is an excellent summary, an 8-page bibliography, an author and species index, a detailed table of invertebrates taken in hard woods and conifers, and 8 photographs. All in all, a most valuable, scholarly piece of work, packed with important findings and comparisons.—M. M. Nice.

27. "Anting" by Birds. Derek Goodwin. 1955. *British Birds*, **48**(1): 47-48. Detailed criticism of Poulsen's theory, reported in *British Birds*, **47**: 312-313, that anting is "merely performed to rub off formic acid or any other irritant from the head."—M. M. Nice.

28. Feeding Rates of Great Tits. John Gibb. 1955. *British Birds*, **48**(2): 49-58. Observations at 52 nests of *Parus major* from 1947-51, mechanically recorded. "The daily total of visits usually increased each day for the first half of the nestling period. In the second half of the nestling period, activity was usually maintained at small first broods, but slackened off at large first broods and late broods." Late broods were less successful than early ones, many young in late broods dying of starvation at about 15 days; the caterpillars on which the first broods were largely fed were no longer available. The author concludes that parents "with large or late broods were straining to feed their young." No figures are given as to numbers of visits nor numbers of young, but 13 graphs are shown. There is also a detailed description with sketches of the mechanical recorders.—M. M. Nice.

29. Nuthatch Roosting Times in Relation to Light as Measured with a Photometer. M. C. Bradford. 1955. *British Birds*, **48**(2): 71-74. A female *Sitta europaea* was watched as she went to roost in a nesting box on the majority of afternoons from Nov. 11 to Mar. 21. No consistent relationship with the amount

of light was found. From November through January she roosted at about sunset, but in February and March she roosted before sunset, usually at much higher photometer readings than in the early winter. In the mornings she left "with great regularity close to the time of sunrise."—M. M. Nice.

30. The Behaviour of a Pair of Great Tits at the Nest. Monica M. Betts. 1955. *British Birds*, **48**(2): 77-82. Nine young *Parus major* were watched in an observation nest box for 6 hours daily for the 19 days of nest life. "The rate of feeding increased to a peak on the eleventh day and thereafter decreased, the fall being correlated with an increase in the size of food items brought to the young." Two or more items were brought on 22 percent of the visits. "The female left the box before sunrise until the young were half grown, after which she emerged progressively later. The male was active rather earlier than the female." She entered the box from 11 to 68 minutes before sunset. The working day was about 16 hours long.—M. M. Nice.

31. The Nature of "Anting." K. E. L. Simmons. 1955. *British Birds*, **48**(2): 94-96. A detailed discussion criticizing Poulsen's theory. The author concludes that this "behaviour functions in some way, yet not understood, as a superior preening method."—M. M. Nice.

WILDLIFE MANAGEMENT

(See also Numbers 2, 3, 4, 20, 40, 47)

32. Acute Toxicity of Certain Insecticides to the Bobwhite Quail and Mourning Dove. James H. Dahlen and Arnold O. Haugen. 1954. *Journal of Wildlife Management*, **18**(4): 477-481. Using 212 Bobwhite Quail *(Colinus virginianus)* and 64 Mourning Doves *(Zenaidura macroura)*, the levels at which half the treated individuals succumbed (median lethal dosage or LD-50) were as follows: (1) For Bobwhite Quail—aldrin, 4-4.5 mg/kg; dieldrin, 12-14 mg/kg; toxaphene, 80-100 mg/kg; and lindane, 120-130 mg/kg (males) and 190-210 mg/kg (females). (2) For Mourning Doves—aldrin, 15-17 mg/kg; dieldrin, 44-46 mg/kg; toxaphene, 200-250 mg/kg (estimated); and lindane, approximately 350-400 mg/kg. Doves appeared to be almost three times as resistant to the insecticides as Bobwhite Quail. The doses below those causing acute toxity had no perceptible affect on the breeding potential of quail. No cases of insecticidal mortality were found in agricultural areas, apparently because insecticides are used at low concentrations and the toxicants do not accumulate sufficiently to cause death.—Helmut K. Buechner.

33. Duration of Fertility in the Domestic Mallard Hen After Isolation from the Drake. William H. Elder and Milton W. Weller. 1954. *Journal of Wildlife Management*, **18**(4): 495-502. Groups of female Mallards *(Anas platyrhynchos)* were isolated on four occasions with similar results, showing maximum duration of fertility of 12, 14, 15, and 17 days after separation from males. Fertility of eggs laid the first week (64 percent) was much greater than that of eggs laid during the second week (37 percent) of isolation from the drakes. Less than 3 percent were fertile in the third week. From these experiments with domestic Mallards one may conjecture that second fertile clutches of eggs required the presence of a drake.—Helmut K. Buechner.

34. Unusual Ruffed Grouse Density in Benzie County, Michigan. Walter L. Palmer. 1954. *Journal of Wildlife Management*, **18**(4): 542-543. A crew of 4 men spaced 10 feet apart covered 105 acres during eradication of *Ribes* spp. for control of white pine blister rust counted 15 Ruffed Grouse *(Bonasa umbellus)* nests, representing a population of about 29 grouse per 100 acres. This was the highest density of Ruffed Grouse nests ever recorded in Michigan. Prior to Palmer's record, the highest spring population in Ruffed Grouse, 25 birds per 100 acres, was reported from Minnesota by Ralph T. King.—Helmut K. Buechner.

35. Some Effects of Fluctuating and Falling Water Levels on Waterfowl Production. Ken Wolf. 1955. *Journal of Wildlife Management*, **19**(1): 13-23. This study was conducted from April through September, 1951, in Cache Valley in northern Utah and southern Idaho. Three areas were selected for the study: (1) Swan Lake, a natural lake in southern Idaho with stable water level; (2) Newton Reservoir in Utah, an irrigation reservoir with a receding summer water level; (3) Cutler Reservoir, a hydro-electric impoundment on the Bear River in Utah, characterized by fluctuating water levels. The following species were found at Swan Lake: Western Grebe *(Aechmophorus occidentalis)*, Pied-billed Grebe *(Podilymbus podiceps)*, Canada Goose *(Branta canadensis)*, Mallard *(Anas platyrhynchos)*, Pintail *(Anas acuta)*, Cinnamon Teal *(Anas cyanoptera)*, Redhead *(Aythya americana)*, Canvas-back *(Aythya valisineria)*, Lesser Scaup *(Aythya affinis)*, Ruddy Duck *(Oxyura jamaicensis rubida)*, and Coot *(Fulica americana)*; at Cutler Reservoir were found: Canada Goose, Mallard, Pintail, Cinnamon Teal, Shoveller *(Spatula clypeata)*, Redhead, and Coot; at Newton Reservoir were found: Pied-billed Grebe and Coot. Flooding caused 31 percent loss of potential waterfowl production on the Cutler Reservoir. The nesting density at Swan Lake was 1 nest per ½ acre; at Cutler Reservoir it was 1 nest per 3½ acres. No evidence was found of a relationship between fluctuating water levels and degree of predation. Damage to waterfowl nests by water was both direct and indirect. Direct factors were: (1) Flooding duck nests and partial or complete submergence of eggs and (2) possible drying of grebe nests by lowered water levels. Indirect factors were: (1) Spilling or burying of eggs by the hens in their efforts to cope with changes in levels, (2) toppling of nests made unstable by dropping water levels, and (3) isolation of nests in the case of Grebes and possibly Coots. Coot nests suffered greatest damage when the water level dropped. Duck nests suffered most from flooding, with the damage principally restricted to Mallards and Redheads. Cattail and bulrush, the principal nesting materials, were tested for resistance to water-logging but no significant difference was found. It was concluded that total rise is not as important as the amount of rise per unit of time. Tolerances to total rise and rate of rise differ between species. The data obtained from the brood study indicated little or no difference in survival between the areas of falling, stable, and fluctuating water levels.—Keith M. Standing.

36. Spring Rainfall in Relation to Mallard Production in the Sacramento Valley, California. Wilbur W. Mayhew. 1955. *Journal of Wildlife Management*, **19**(1): 36-47. Production of Mallards *(Anas platyrhynchos)* on the Conaway ranch in the central Sacramento Valley was found to be high in years of high spring rainfall and very low in years of spring drought. Apparently as many birds nest in dry as in wet years, but relatively few broods appear except in wet springs. Studies were undertaken to determine the relation of moisture to hatching. Measurements of temperature and relative humidity conditions within the nests showed no direct correlation with hatching success. Series of eggs incubated at five relative humidities (40%, 65%, 75%, 85%, 90%) were treated with direct applications of water in varying amounts (dipped daily, dipped weekly, dipped once, undipped). The best hatch was obtained from eggs incubated at 65% relative humidity and dipped in water once a day. The direct application of water at frequent intervals is apparently necessary to obtain a successful hatch, with relative humidity playing a secondary role. It is suggested that the few successful broods produced in the dry years come from nests close to water, where the incubating birds can bring sufficient moisture to the eggs on the feathers. However, most nests are located in grain fields so far from water they are dependent upon rainfall for moisture. Therefore, yearly variations in hatching success are related to frequency and timing of direct wetting of eggs by rainfall.—Keith M. Standing.

37. The Hungarian Partridge in Utah. Richard D. Porter. 1955. *Journal of Wildlife Management*, **19**(1): 93-109. This study of the Hungarian Partridge *(Perdix perdix perdix)* was conducted to determine the size and distribution of the Utah population and to analyze environmental conditions in relation to life history so as to prognosticate the possible success of the species as a game bird in the state. A history of introductions of the bird into the state shows that over

650 birds were introduced from 1912 to the present with no apparent success. The present population, pocketed in those areas where conditions of climate, cover, food, and soil are most suitable to its survival, apparently moved in from Idaho and Nevada. The two areas studied, Standrod, Box Elder County, and Ibapah, Tooele County, showed similar environmental conditions; hay, grain, and alfalfa being the predominant crops, while sagebrush, greasewood, rabbitbrush, and shadscale are the chief components of the native vegetation. The population seems to be affected by the percent of land acreage in farms. Free water appears to be a requirement of partridges in the dry desert areas of Utah. Ants, Lepidoptera larvae, and aphids appeared to be the more important animal food items whereas wheatgrass, wheat, buckwheat and barley seemed to be the most important plant foods present. For nesting they seem to prefer permanent cover becaus the hay, alfalfa, and grain were not dense enough when nesting sites were chosen. After the nesting season temporary cover was preferred. Covey sizes usually averaged about 14 birds, with as many as 75 birds in a winter flock. Farming practices and severe winters are the two most critical mortality factors. Hythergraphic (climographic) comparisons were made of partridge areas in Utah with the average optimum for Europe and with Colfax, Washington, and Edmonton, Alberta, Canada. In most areas of Utah high temperature during June and July are critical. Heavy summer showers may be detrimental. Thus climate, topography, and farming practices are the chief factors limiting the increase of partridges in Utah.—Keith M. Standing.

38. Weather and Fall Pheasant Populations in Iowa. Edward L. Kozicky, George O. Hendrickson, Paul G. Homeyer, and Richard Nomsen. 1955. *Journal of Wildlife Management*, **19**(1): 136-142. To evaluate temperature and rainfall, on a quantitative basis, as factors in the fluctuation of Ring-necked Pheasant *(Phasianus colchicus)* populations in Iowa, the fall roadside census data from 1936 through 1952 were examined for possible weather relationships. An attempt was made to analyze spring weather conditions and the percentage of annual population changes by multiple regression. Two major assumptions were necessary: (1) That the habitat has remained essentially unchanged and (2) that the production response of pheasants has not been governed by the population level of the species. However, the rate of pheasant production was apparently related to changes in habitat and population level. A critical winter period, from December through February, may be detrimental to pheasant populations by reducing the breeding stock. Cold temperatures in May or June resulted in a decrease in fall populations even if March and April were warm. Mean total precipitation above normal in conjunction with low temperatures was evident only in years of decreasing fall populations. With high temperatures precipitation had no apparent adverse effects. Normal spring weather prevailed during years in which the fall population either remained the same or increased. There are many unevaluated combinations of temperatures and rainfall during winter and spring. There is obvious need for a better understanding of what constitutes a critical deviation from the mean temperature or rainfall.—Keith M. Standing.

39. Mourning Dove Production in South Central North Dakota. Robert N. Randall. 1955. *Journal of Wildlife Management*, **19**(1): 157-159. During the summer of 1952 the author studied the breeding populations and production of Mourning Doves *(Zenaidura macroura)* in two types of nesting cover in the vicinity of Bismarck, North Dakota. One was a shelterbelt typical of many windbreaks around farmsteads of the central North Dakota prairies. The other was an isolated patch of natural cover in the head of a small coulee. He examined all possible nesting sites in both areas, recording on each visit the status of all nests that were active or had been active. He found 123 nests in the coulee in which 156 nesting attempts were made, for an average of about 1¼ attempts per nest. In the shelterbelt, the 23 nests observed showed 31 attempts for a similar rate of attempts per nest. In the coulee about 70 percent of nestings were successful while in the shelterbelt at least 77 percent were successful. Nesting activity appeared to reach a peak in the shelterbelt much earlier than in the coulee. The species evinced little preference between trees or shrubs for nest sites, and nest loss from the occasional strong winds was slight. During the study 126 doves were banded.—Keith M. Standing.

PARASITES AND DISEASES

(See also Numbers 32, 47)

40. The Occurrence of Gizzard Worms in Canada Geese. Carlton M. Herman and Everett E. Wehr. 1954. *Journal of Wildlife Management*, **18**(4): 509-513. Distribution and variation in incidence of the roundworm parasite, *Amidostomum anseris*, the most common parasite in Canada Geese *(Branta canadensis)*, are reviewed in this paper. When the number of worms exceeded 150, extensive erosion of the gizzard lining was evident. In the bird with the most worms (1,537) the gizzard was completely denuded. Usually *A. anseris* is a contributing rather than primary factor in mortality. One of the most severe losses (predominantly younger birds) was in the winter of 1948-1949 on Pea Island National Wildlife Refuge in North Carolina where several hundred geese, or about 10 per cent of the population, died.—Helmut K. Buechner.

MORPHOLOGY AND ANATOMY

(See Numbers 43, 44)

FAUNISTICS

41. The Value of the Christmas Bird Counts. Paul A. Stewart. 1954. *The Wilson Bulletin*, **66**(3): 184-195. The large quantities of data gathered in 50 years of American Christmas bird counts are critically examined to determine their potential in quantitative ornithology. It is suggested that these counts could possibly be a highly effective method of collecting data on early winter bird populations, but techniques now used lack the refinement necessary to have much scientific usefulness. So many variables are involved, including a slow trend toward improved methods, that the lists from different years and different localities are seldom comparable. A need for increased standardization is emphasized. It is concluded that the counts will probably always contain some flaws, but that their scientific value can be enhanced without serious infringement on their popular appeal.—L. Richard Mewaldt.

42. American Land Birds in Western Europe. W. B. Alexander and R. S. R. Fitter. 1955. *British Birds*, **48**(1): 1-14. An examination of records for the past 150 years. There are 103 of these that can be dated to a month, in contrast to 203 for North American wading birds. More than five-sixths of the total are for the British Isles. A marked peak has occurred in autumn and a less marked one in spring. Records for the land birds are discussed in detail under each species. (The authors are in error in considering Hairy and Downy Woodpeckers and the Mockingbird as non-migratory.) They conclude that many of the records of American land birds are not of escaped cage-birds, but represent genuine "drift-migrants," the British Isles providing a "refuge for storm-blown American migrants."—M. M. Nice.

SYSTEMATICS

(See also Number 49)

43. Myology and Serology of the Avian Family Fringillidae, a Taxonomic Study. William B. Stallcup. 1954. *University of Kansas Publications, Museum of Natural History*, **8**(2): 157-211. Through study of leg muscle and serology, the author decided that the richmondenines, emberizines and tanagers should be included in the family Fringillidae, but that the carduelines and estrilidines should be placed in a separate family, the Carduelidae.—M. M. Nice.

44. A Systematic Study of the Avian Family Fringillidae Based on the Structure of the Skull. Harrison B. Tordoff. 1954. Miscellaneous Publications, Museum of Zoology, University of Michigan, No. 81. 42 pp. The author concludes that the Carduelinae can be separated from the remaining Fringillidae in certain anatomical features, diet, migration and singing habits, social behavior and nest sanitation. He might also have included length of nestling life—12-17 days in the Carduelinae, 8-10 days in Richmondeninae and Emberizinae. "It seems reasonable to conclude that the carduelines are ploceids." He includes the Thraupinae with the Fringillidae.—M. M. Nice.

FOOD HABITS

(See also Numbers 22, 24, 26, 28, 47)

45. More Material on Food Habits of the Eagle-Owl. (Neues Material zur Ernährung des Uhus.) 1954. Rob. März. *Die Vogelwelt*, **75**(5): 181-188. Individual prey items from Eagle-Owl *(Bubo bubo)* pellets from four regions in East Germany and from Rogaland, Norway, are tabulated and compared. März concludes that the basic food of the Eagle-Owl, especially for successful rearing of young, is medium-sized prey: hares, rabbits, hedgehogs, hamsters, partridges, crows, etc. Too high a proportion of small prey items (mice or amphibians) is a symptom of famine. A highly varied food list, rather than the selection of a chief prey species, is also considered a portent of poor Eagle-Owl reproduction. This paper would have been more valuable to other workers if März had mentioned the number of pellets on which his tabulations were based.—Frances Hamerstrom.

SONG

46. Japanese Bird Songs. Published by The Victor Company of Japan with the assistance of the Japanese Wild Bird Association. 2 Vols., each containing three 10-inch discs with a total of 30 species of Japanese birds. Available from R.C.A. Victor Dealers in America on special order at a cost of approximately $5.00 per volume depending on import costs. The recordings were made by Mr. Kasake Hoshina, Mr. Tsuruhiko Kabatani and Mr. Yoshihiko Kabatani, with the encouragement of Mr. Godo Nakanishi, President of the Japanese Wild Bird Association.

The albums which hold the discs are attractively prepared and are decorated with drawings, in color, of the birds. There are no English captions on either the albums or the discs, and there are no announcements of any kind on the discs.

A 16-page booklet accompanies each volume of records. The text gives in Japanese a simple description of each bird, its relationship, its song and its preferred habitat. A simple black and white sketch gives a visual impression of each bird and these sketches are reproduced on the covers of the booklets. The scientific name and an English common name is given for each species. Otherwise the text is in Japanese.

The original recordings were made on magnetic tape and the originals may be excellent, but the pressings have been made on a shellac base and the reproduction quality is poor, even when compared with American recordings of 15 years ago. However the recordings are entirely capable of giving a good impression of the songs of these 30 birds and as such are highly recommended.

Of particular interest to Americans will be the songs of the close relatives of the American Robin. Four members of the genus Turdus are represented. In most of these it's quite easy to detect a "Robin-like quality," but the White's Ground Thrush is represented as having only a weak whistled note slightly reminiscent of our Veery call note.

Dr. Oliver Austin, Jr., through whose good offices these recordings were made available, laments some notable omissions from the series, but from experience, I can sympathize with those who did the field work, for I know how exasperating can be the trials associated with recording some much desired species even though it is abundant. Sometimes it seems that bird, weather, mechanics and electronics

diabolically conspire to thwart one's most sincere efforts. However, in a letter accompanying the recordings, Dr. Austin is assured that plans are afoot to improve the recordings greatly and make them available in more up-to-date form and quality.

Any ornithologist or bird enthusiast planning on visiting Japan would, I feel, be well repaid for spending several hours listening to and making notes on these recordings.—P. Paul Kellogg.

BOOKS

47. The Passenger Pigeon/its natural history and extinction. A. W. Schorger. 1955. University of Wisconsin Press, Madison, Wisconsin. 8vo, 432 pp., 19 figs., price $7.50. Not only is this book an encyclopedia of knowledge of the extinct Passenger Pigeon but also a text book for the study of extirpation of birds. There probably is no pattern for the extinction of all bird-species, but the study of the spread of European civilization during the past 300 years and its effects will perhaps come close to revealing such a thing in many of these sad events.

Every phase of the Passenger Pigeon's history as well as the distressing story of the eventual destruction of the species is discussed in detail in the book's 16 chapters. The titles indicate the scope of the work. These are (1) Early Accounts, (2) Behavioral Characteristics (voice, fear, intelligence, physical habits, sociability, domestication), (3) Food (methods of feeding, plant foods, animal foods, mineral substances, effect on agriculture), (4) Movements (flight, shape of flocks, effects of weather, crossing lakes), (5) Roosts, (6) Nesting (colonial nestings, nesting procedures, aberrent nesting, number of nestings), (7) Utilization (the Indian and the pigeon, squabs, commerce, trapshooting), (8) Methods of Capture (netting, shooting), (9) Decrease and Extinction (population figures, decrease, enemies, extinction, conservation and legislation), (10) Description, (11) Anatomy and Physiology, (12) Nomenclature, (13) Distribution, (14) Migration, (15) Late Records, (16) Evaluation of Illustrations.

The care and good judgment with which the many contradictory reports in the literature are evaluated is admirable. For example, Dr. Schorger has determined that only one egg could possibly have been laid in a clutch although contemporary authors by no means have agreed about whether two might not sometimes have been laid. He states also that, unless a storm or other accident broke up the first nesting, it is doubtful that more than one took place because of the probability that the nutritive mast available would be insufficient to permit more than a few birds to nest a second time. In spite of this obvious handicap, Dr. Schorger estimates that the population may have numbered ("at a guess") three billion—perhaps between 25 and 40 percent of the total population of birds on the North American continent. In accounting for this he assumes that the Pigeon was a long-lived species with a low rate of mortality. With these hypotheses as bases, it becomes apparent that the excessive predation to which the population was subjected could theoretically have destroyed the entire species.

The recorded history of this once astoundingly numerous species begins with Jacques Cartier's sight record for Prince Edward Island of July 1, 1539 and ends with the last certain record of a wild bird, shot at Babcock, Wisconsin, on Sept. 15, 1899. The period was one of constant destruction of wild resources of all sorts. Dr. Schorger in a chapter "Decrease and Extinction" discusses every conceivable cause for the destruction of the species. He states that "the conclusion is inescapable that the passenger pigeon became extinct through such constant persecution that it was unable to raise sufficient young to perpetuate the race," with a great deal of information from every possible source, including contemporary newspapers and magazines, to document his thesis. He has amassed a bibliography of 2,200 titles in preparation of the book.

The majority of birds that have been extirpated within recorded historical times were true species, and further they were those especially distinct morphologically and probably specialized in habits. The Passenger Pigeon was no exception. Beyond the fact that their specialization, particularly their gregarious habits, made them an easy prey for men, there may have been another attribute which predisposed them to extinction. It appears that even after the last large colonial nestings were destroyed the birds lived in pairs and small parties. There is no

evidence that these were more disturbed than the nests of other birds, for example, the Mourning Dove. The last large colonial nesting took place in 1851, 1855, and 1886 in Massachusetts, Ohio and Wisconsin respectively, but small parties and pairs were reported to nest in 1880, 1893, and 1894 in those states. It is remarkable that they were not able to breed in isolated pairs. Perhaps the kill of the adult population was too great, putting too much pressure upon the factor of longevity so important to survival of this species. There is little direct evidence now available.—J. C. Greenway, Jr.

48. Bird Life. Niko Tinbergen. 1954. Oxford University Press. London. Geoffrey Cumberlege. 64pp. 8s. 6d. net. This is a book designed for beginners, one of the Oxford Visual Series, in which "text and illustration are of equal importance." In simple words, with a wealth of his own sketches and photographs, Dr. Tinbergen gives us the essence of bird biology. Through vivid descriptions of actual experiences with birds the subject of each chapter is made alive; then it is amplified by comparisons with the behavior of other species. After chapters on movements, feathers, song, fighting, courtship, nest building, and incubation we join the author in watching families of Herring Gulls, Hobbies, and Great Tits.

Some other chapters of particular interest are on "Why Do Birds Behave as They Do?" and "The 'Language' of Birds." Some "people try to work out theories, thinking hard about the animals' minds and personalities without, perhaps, spending enough time in watching what does happen . . . it is above all necessary to observe what birds do before thinking out theories," (p. 52). Bird language consists of visual and auditory signals. It "is extremely simple—merely making the other bird do a certain thing, do it now, go towards the caller or away from it, and perhaps, in rare cases, making it go 'there'. It is amazing to see how on these simple principles birds manage to 'run' their communities," (p. 55).

The author has a deep love for nature, and with no false sentimentality. The opening incident involves the capture of a Tit by a European Sparrow Hawk, and the frontispiece is a beautiful colored plate of Joseph Wolf's painting of a Tengmalm's Owl with a Blue Tit in its claws. The last two chapters deal with "Some Practical Hints"—a discussion of hides (blinds), of attracting birds, and sketching them, and "Bird Books, Bird Journals, Bird Clubs" with a list of Bird Observatories, showing the great encouragement offered in Great Britain to young naturalists. Never do we get the discouraging idea that all is known; on the contrary the book is always pointing the way as to how the reader can observe for himself and add to our knowledge; the need is stressed for "continued, detailed, quantitative knowledge" and for "more ornithologists of the perservering kind." A wonderful book that will delight and inform not only beginners, but all students of nature.—M. M. Nice.

49. Birds of France. (Oiseaux de France.) 1954. No. 9., 34 pp.. Association pour l'Etude dans la Nature des Oiseaux de France et leur Protection, 129 Blvd. St. Germain, Paris 6, France. 100 francs. In this issue the Association has consolidated two issues into one unusually well-balanced volume. In the migration and banding section Dr. Marsille reviews rather critically the new manual by M. Chaigneau and takes exception to some of the sizes of bands recommended. The section on protection discusses the French League for the Protection of Birds, its sanctuaries, and its goal of popularizing interest in birds. Other sections concern the Association itself, courtship behavior, book reviews, and miscellaneous notes and announcements. A 6-page study treats the identification, distribution, and local haunts of the French vultures, eagles including the sea eagle, and the osprey, illustrated by a fine full page plate in the Peterson manner by Jacques Penot.

The feature article, Life History of the Booted Eagle, *Hieraëtus pennatus*, by Jacques Penot and Marc Laferrere, with illustrations of the bird at rest and in flight and a distribution map, compares favorably with Bent's life history studies. The section on synonymy is a bit rugged for an amateur, and the entire article tends to be rather advanced for its intended audience. The authors question the validity of the genus, and consider the species to be at best a subgenus of *Aquila*. They also point out the white flecks on the forewings, which Peterson gives as a field mark, are variable, inconsistent, and easily overlooked.

As an experiment in fostering interest and speeding up learning among amateurs, this publication's tactics are a far cry from those followed by the popular bird publications in the United States. The continued publication of the sort of papers this volume contains will raise it out of the amateur class into the professional. Perhaps we underestimate the ability of our own public to learn and progress. We shall be interested to learn of its effect on the French amateurs.—Wendell Taber.

50. Stray Feathers from a Bird Man's Desk. Austin L. Rand. 1955. Doubleday & Company, Garden City, N. Y., pp. 1-224, 61 cartoon illustrations, price $3.75. The 61 chapters in this book are an engaging potpourri of odd bits of information about birds and their habits, presented skilfully, simply, and interestingly for lay consumption. The emphasis, if there is one, is on the anthropomorphic aspects of bird behavior, and the subjects range from birds as brigands and as pilferers, to their use of tools, ability to count, and solution of the baby-sitting problem.

Obviously written for possible use as a newspaper column, each chapter runs from 500 to 1,000 words and is subdivided for easier digestion. The newspaperish subhead leads introducing many of the paragraphs are often inappropriate and, to me, detract from rather than add to the text's readability. Nor do I particularly admire the title—scarcely less awkward and certainly more descriptive would have been "Columns Clipped from the Culled Cogitations of a Cultured Curator." Or how about "Rambling at Random with Rand"?

Aside from these minor faults, the columns themselves are exceedingly well done. They contain a wealth of accurate, authoritative information, presented with a light and amusing touch. That no feature syndicate picked them up for distribution reflects the newspaper editors' judgement of the public taste, not the columns' worth and interest. I fear that in book form they will never have the far wider audience and sale they deserve.—O. L. Austin, Jr.

NOTES AND NEWS

Those interested in banding who drive to Boston for the American Ornithologists' Union meeting in October would be welcome at the editor's banding station (37 Old Brook Road, West Hartford, Conn.) on the weekends before (Oct. 22, 23) or after (Oct. 29, 30) the papers session at Boston. The station offers a wide variety of plantings for birds, and of traps; weather permitting, mist nets will be in operation. It is likely that the migration of White-throated Sparrows will be tapering off, with Juncos and Fox Sparrows increasing (in the fine migration of October, 1954 we banded 900 individuals, of 30 species).

The station is only a few miles off the main parkway route from New York to Boston: take the Merritt and Wilbur Cross Parkways, turn left on Conn. 173 in Newington, left on Asylum Ave. in West Hartford ("T" intersection), right at first traffic light (onto Conn. 185), left at next light (onto U. S. 44). Turn diagonally left after just one mile (at the intersection of Mountain Road, with overhead blinker), on Old Oak Road, take the middle road of three (Old Brook Road), after a tenth of a mile, go another tenth of a mile. From Boston, on the Wilbur Cross Highway, turn right on U. S. 44 in Manchester.

The 1955 annual meeting of the Northeastern Bird-Banding Association will be held on Saturday, October 1, at the Cook's Canyon Sanctuary of the Massachusetts Audubon Society, in Barre, Mass. The meeting starts at 10 A.M., Eastern Daylight Time; bring a picnic lunch (coffee will be provided). All those interested in banding are welcome.

BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

Published quarterly for:

THE NORTHEASTERN BIRD-BANDING ASSOCIATION
THE EASTERN BIRD-BANDING ASSOCIATION
THE INLAND BIRD-BANDING ASSOCIATION

Applications for membership in these associations should be sent to their respective secretaries. The annual membership dues of $5 per year in the Northeastern Association include a subscription to *Bird-Banding*. Membership in the Eastern and Inland Associations is $2 each per year; members of those associations who wish to receive *Bird-Banding* may send $4 direct to the secretary-treasurer. Subscription price to non-members of the associations is $5 per year; single copies $1.25.

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